JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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EDITORIAL NOTES.

The Gas Industry's Affairs in Parliament.

DURING the suspension of active legislative work, before which suspension proceedings controversial and formal on Private Bills had been practically concluded, is an appropriate time to indulge in a little retrospect of the course of events so far as they affect the gas industry generally. In last week's issue, the gas administrations whose managerial policy is strictly confined to their own immediate affairs were urged to break through their narrow environment, and to regard themselves as part of a large industry, with interests that have to be protected and furthered by co-operative means. The submission will brook no denial whatever that the stronger the industry is in this way in the present, the stronger will the industry be in the future. As was pointed out a week ago, the Gas Bill work of this session has illustrated more perhaps than that of any previous one, the necessity for universal policy and action in all matters pertaining to the general well-being of the industry. Foremost, of course, stands the delimiting movement of the Alkali Manufacturers' Association, at the beginning of which movement the momentous issues for the gas industry were not fully appreciated. The principle of confining here and there an undertaking to working up and dealing in its own residual products did not appear in the initial stage to tend to such large industrial issues as were forced very shortly afterwards upon notice by the act of the chemical manufacturers themselves in asking for the insertion of restriction in every Bill before Parliament in which gas matters constituted the whole or merely a part of the measure. Then, and not till then, it was seen, and that very plainly, that the aim of the chemical manufacturers was to constitute themselves the sole markets for the raw residual products of the industry; and it needs no argument to show that such a position would invest them —a manufacturing and trading industry, subject only to laws or regulations of their own making in relation to their commercial operations—with power to compel a statutorily controlled industry to sell to them their unworked products on the chemical manufacturers' own terms.

Here we see, if Parliament continues to assist the chemical manufacturers, a powerful situation being gradually created for the depression of prices to the advantage of the buyers, which is unjust to the selling industry, and to the community that the industry serves. How such a situation would affect the whole industry is as transparent as anything can be; and we cannot imagine any gas undertaking withholding its hand in offering resistance to this, any more than we can understand the motives of anyone identified with the industry doing anything, by act or by refusing support, to aid the chemical manufacturers in bridling the industry now that the object and issues are so definitely manifest. The ultimate situation that would be created by the success of their adroit movement is what all administrations and all individuals in the gas industry have to keep their eyes upon; and, doing this, we have no fear that those who will ere long appear for the gas industry before the Joint Committee of the two Houses of Parliament will do so armed with the authority to plead, on behalf of the whole industry, for exemption from any control of the business in secondary products by private interests that have largely lived, and have lived well, upon the gas industry, and would still continue to do so by a continuity of the conditions that have hitherto obtained, and, under which conditions, there has been sufficient evidence of the trading power of the chemical manufacturers. Incidentally, it may be remarked that we are quite aware that the chemical manufacturers do not approve of the part the "JOURNAL" has taken in the work of keeping to the front the broader issues of their parliamentary and self-interested movement, and, by so doing, stimulating resistance; we are also perfectly aware that our friendships in the chemical manufacturing industry have not been strengthened by the action taken. But the chemical manufacturers will at least do us the justice of agreeing that our plain duty was on the side of the gas industry, and that on our part there has been no misinterpretation of their intentions. Equally, the chemical manufacturers must be well aware that their action has not been conducive to promoting the most amicable relations with the gas industry. But, on the other hand, if, as the result of the general inquiry into the whole matter, the gas industry succeeds in their case for the maintenance of open competition and markets for raw residual products, the chemical manufacturers will not find the gas industry bearing ill-will towards them.

Touching other matters. The session has seen two large amalgamations of Gas Companies carried through, on the ground of public advantage, through the material economies that the fusion of interests and territory will enable the Boards of the amalgamated concerns to gradually develop. The one has brought about the concentration of the work of supplying gas to the areas of the South Suburban, the Bromley and Crays, and the West Kent Companies; the other has produced the like concentration for the areas of the Wandsworth and Putney, the Mitcham and Wimbledon, and the Epsom and Ewell Companies. In both cases, the areas of all these Companies have been brought into direct communication with the facilities afforded by the River Thames. This being so, there can be little question as to the developments of the future being in the direction of making good use of the natural advantage that amalgamation has bestowed upon the extensive territories. But the two Acts that have brought about this condition contain clauses that mean much to the industry as a whole. They, for the first time in the history of gas legislation in this country, suppress illuminating power as the standard of quality for gas (excepting temporarily, we believe, in a relatively small part of the district of the South Suburban Company), and have set up calorific power as the superseding standard quality. The terms of the new standards of the two Companies are almost identical; but the expression of the terms of the South Suburban Company will meet with the more general acceptance. The importance to the gas industry of this change is that it may be taken that henceforth where promoters of Bills do not themselves propose a calorific power standard in lieu of an illuminating power one, the advisers of petitioning parties will frequently be found, and quite rightly so, persuading their clients to ask for the alteration in the standard. In the gas industry this will now hardly be a matter for contention, save in respect of fair terms having particular regard to coal and manufacturing conditions. There were some other notable points in connection with the Wandsworth Bill. One was that, in the course of the proceedings, a clause found its way into the measure, which (as was done in the case of the West Ham works on their acquisition by the Gaslight and Coke Company) bound the Company to maintain for a specified number of years the works of the Mitcham and Wimbledon Company, and to continue for the period to employ as many men as were engaged there prior to the promotion of the Bill. But the clause was expunged by the Private Bill Authorities as being contrary to public interests, and opposed to the primary motive for amalgamation—the promotion of economical working and business development in the interests of the public. Precisely the reasons advanced by the Private Bill Authorities in this connection are those on which the gas industry claim the abandonment of the chemical clause. There is one other matter arising out of the Wandsworth Bill—the depth of gas-pipes—to which reference will be made in an article next week dealing with the part that public and other authorities have had in the gas legislation of the session.

Meanwhile, it may be added that the Benefits Funds Bill jointly promoted by the Brighton and Hove and other Gas Companies commended itself to Parliament, although the promotion had to be split up, in order that consideration might be given to the proposals from the individual stand-

point rather than collectively. The effect of the Acts in this regard is to place on a statutory basis all appropriations of revenue, with a limit attached, devoted to the amelioration of the lot of the employees of the Companies concerned. The beneficent scheme was opposed by the Brighton Corporation; but that authority has been taught that a parochial narrow-mindedness must give place to such humane considerations as were advanced by the promoters, and subscribed to whole-heartedly by the Committees of Parliament before whom the measures came. The second joint Standard Burner Bill went through without opposition; and the last has been heard of hostility to the "Metropolitan" No. 2 burner where a calorific power standard is not adopted. One other matter of general importance that comes into this particular category of principal features of the work of the session, is the variation obtained by the Herne Bay Gas Company of the conditions applying to the formation of a reserve fund. The Company are to be permitted to set apart out of their divisible profits in any year such sum as they may think fit by way of a reserve fund, instead of from the part of the divisible profits that is applicable to excess dividend over the standard rate.

Gas-Fire Efficiency.

THE summer holidays are coming to an end, though it has been the modicum of summer weather that the country has enjoyed; and gas managers the country through will soon be considering the question of gas-fire stocks and the selection of the types of which they will be making a speciality. The gas-fire manufacturers, it will be found, have been busy in improving their designs; and the new season will also find most of them still—and, if possible, more—keenly alive to scientific accuracy and efficiency in their productions. The makers of gas-fires appreciate the fact that there is infinite trade for the suppliers of gas in household heating, and that most gas undertakings will consider it very good business to develop this line of their commerce without paying much attention to the question of the load factor. Makers of gas-fires also recognize the fact that the development of the use of gas in this direction means good business for them; and that their own efforts are as necessary to domestic heating progress as are the efforts of the gas engineer to produce for heating purposes gas of fairly uniform calorific power, composition, and specific gravity, at a reasonable and tempting retail price. This mutuality of interest is an excellent thing, just as is the competition between the makers of gas appliances to turn out from their factories fires of high efficiency in all respects. It is to their interest just as much as to the interest of the gas-supply industry that the fires they produce should be able to claim and demonstrate a high efficiency not only thermally but hygienically. The exteriors of the fires they supply show good artistic taste, and a suitability for all situations. There is really little to choose between one firm and another in this regard; and we are inclined to think that now gas managers will be raising their standards of efficiency in determining their purchases. They know that high heating and hygienic efficiencies can be obtained; and they would be foolish, in the interests of their heating business, if they did not demand, and see that they get, these high efficiencies. On the other hand, the makers are fully cognizant of the fact that, with the immense undeveloped heating field before them, their own future success has, primarily, efficiency for its high road.

We have done everything possible, by making known the tendency, to encourage the makers in their new practice of bringing scientific ability to their aid in producing higher efficiency; and we shall continue to do so—giving credit to pioneer movement, but without allocating to any one quarter an absolute monopoly or possession of all the accomplishments that can contribute to progress. We all—the best of us—have our limitations; yet, in some way or other, we can all contribute to advance by putting the best possible into the work that comes to hand. From whatever quarter emanates gas-fire or other improvement that promises well, there will be acknowledgment in our pages. The importance, however, of taking a discriminating and independent attitude in this connection to-day is more desirable than ever. The gas-fire has justified itself. As an article of household convenience and economy—taking into consideration cleanliness, labour, and the absence of fuel stand-by losses as in coal-fires—its popularity is rising with increased pace. The prospects will lead to keener competition between the makers for the production of those qualities in gas-fires that will dominate the market just as much as the one of price—if not more so. And it is the competition for the production of these qualities that will make an independent attitude in the circulation of intelligence very essential.

We have, for example, had the question of the standard of the hygienic efficiency of gas-fires brought prominently before us of late. Hygienic efficiency does not occupy a lower platform than heating efficiency and economy; and several of the makers have paid special attention to it. In more than one works, we have had demonstrated the tests that are carried out to ensure hygienic efficiency. It will be remembered that one of the large makers recently proposed that the standard of hygienic efficiency should be the complete avoidance of the escape of products of combustion from beneath the canopy of the fire, with the fire unaided by chimney draught. Of course, no one has suggested—this was made abundantly clear in the descriptive article—that a gas-fire cannot be perfectly hygienic when fixed, and when receiving the aid of the draught of the chimney. Apart from the Leeds University, Glasgow, and other tests made absolutely independently of the makers, personal experience proves that gas-fires can be. But in this connection, we are not prepared to endorse, without further satisfaction than a bare statement, this submission which appears in an article in other columns to-day: "A fire that "carries off all its products without being attached to a flue "will, when an ordinary chimney draught comes into play, "inevitably carry off more than the products—to wit, an "unnecessary number of heat units as well, and a lowered "room heating efficiency is the result." We do not think there is much scientific evidence to support such a generalization as this. To a large extent its truth must depend upon the construction of the gas-fire. It must also depend, among other things, on the velocity of the chimney draught itself. We are not at all convinced that the submission will, on further mature consideration, live long in the mind of the technical staff of the firm that has now put it forward. What does it amount to? Simply a confession of an inability to construct a gas-fire which will discharge its products of combustion through the flue opening without a chimney draught, and which, when brought under the influence of the flue draught, will not also part (as a consequence of the perfection *minus* the flue draught) with more of its heat units than if the perfection in question did not obtain. This is the true interpretation of the statement. Let us take a fire that has all impediments to the free passage of the products to the flue opening eliminated, and a canopy properly constructed in relation to both canopy and flue opening. Such a fire may not need anything more than an elbow and a few inches of flue-pipe as a guide to the house chimney and a protector against cross draughts. Some people would say that such a fire would not require them. Now is this fire going to part with more of its heat units (always providing the fire is properly constructed) than a fire that requires 2, 3, or perhaps more feet of flue-pipe up the chimney to overcome the inclination of the fire, under certain conditions, to pass products of combustion from beneath the canopy. We are not prepared to say on mere *ipse dixit* that the former will part, by way of the chimney, with more of its heat units than the latter. The operative forces in the two cases, as we have presented them, are totally different—the flue-pipe-fitted fire providing the more active and stringent of the forces.

The article from which the above quotation was made also supplies stimulant to fresh thought and enterprise, and work for the gas manager with the local builders. Architectural principles in house design have undergone many changes, but amid all these changes the coal grate has maintained its conventional position. There is to-day no reason whatever why it should do so. The gas-fire grate is with us. Why should not gas-fire grates be introduced in certain rooms when the house is being built, instead of coal-fire grates? Into rooms in the best and middle class houses where fires are only occasionally required, a gas-fire is almost certain to find its way; and why, ask the makers of gas-fire grates, should they not be set there first as last, without expense being incurred by putting in a coal grate to perish without being used, through being superseded (owing to the preference of the tenant) by the gas-fire? There is waste involved in the construction of houses due to the traditional establishment of coal grates; and there is waste of artistic feature by the circuitous process of arriving at what the tenant actually requires. There is ground here for the co-operation of architects, builders, and gas authorities.

Spontaneous Combustion and Deterioration of Stored Coal.

PROBABLY there are no subjects relating to coal that have been so prolific of diverse opinions, experiences, and practices, and contradictory theory, than the two mentioned in the above heading. The fact of the matter is that the subjects have never been investigated with the thoroughness that their importance demands, having in view the vast amount of money involved in stored coal, and the value of prevention of spontaneous combustion and of preservation from deterioration. We are thus reduced to acknowledging that the work so far accomplished has done nothing more than show not the way to an assured prevention of the one or the other, but how the conditions that promote the unwelcomed effects can be modified. However, the importance of the subjects and their problems ascend with the compulsory consideration of the question of increased storage through the greater disturbance of the lines of communication between the natural subterranean coal-stores and the coal-stores on gas and other works, and which greater disturbance causes us to recede further and further from the impossible but ideal cycle of operations that suggests coal being delivered as and when needed, carbonized, and the resultant coke dispatched there and then to the destinations where it is required. This being the state of affairs, it does not need pressure of the point to show that the proper solution of the problems, by a thorough research, would be of even more advantage to-day than heretofore.

Under the circumstances, the study that has been made by "Almea," of the work that has been done, and of the views that have been expressed, in regard to the subjects of spontaneous combustion, deterioration, and storage, and the digest of the work and views that he has made in an article appearing elsewhere, with deductions of his own, will be found very informative, and the article may assist in inspiring other workers—especially our chemical friends—to try to carry us further in our knowledge of these matters. We are afraid, however, that the problems are so complex, owing to the constitutional and physical characteristics of coal being so diverse, that the goal of preventative means assuring positive immunity from the disconcerting and the depreciating incidents of coal storage will never be reached. But this view is no reason why we should not get as near as possible to the goal; and we cannot help thinking—more especially after reconsidering the subject, with "Almea's" article refreshing the memory as to the accomplished work, and as to the still extended prevalence of mistaken notions (some of which facilitate, rather than obstruct, the conditions that promote spontaneous combustion and deterioration)—that there is still useful suggestion to be derived from further investigation. It is not claimed that in "Almea's" article there is anything fundamentally new; its value lies in its succinct review of the subject.

There is little question to-day, as our contributor says, that the spontaneous combustion of stored coal is due not to any single condition but to a combination of conditions, and that, with different coals, the conditions contributing to the undesirable end vary. The writer points out in one part of his article that it is probable that spontaneous heating in coal heaps is due to the rise of temperature caused by the oxidation of part of the carbon, together with the sulphur, in the coal; and, in cases where actual firing takes place, it may be assumed that the heat generated in the stack is greater than that dispersed by radiation. Thus the temperature rises until the ignition-point is reached. The road to prevention is by ascertaining the causes; and when the foregoing sentences are considered, they will show clearly to those who have been following the mistaken practice of deliberately providing means for air currents and ventilation in the stacked coal that they have been doing something that may, more or less, according to the characteristics of the coal, contribute to the very end they are trying to avert. Professor Lewes has shown us that some coals have a greater avidity for oxygen than others; and the greater the avidity, the greater the liability of the coal to fire, provided means are afforded for supplying the coal, by air currents through it, with the necessary oxygen for it to absorb. What is more, as the temperature of the coal rises with the absorption of oxygen, so its capacity for absorption increases. There is also the fact that the action of occluded oxygen is enormously aided by the presence of moisture. It does not need much deliberation to see the value of this knowledge in pointing the way to a reduction of the chances of spontaneous combustion. Our contributor's article suggests simple means for lessening these chances—most of them known to many of our readers, while practice in other places suggests that there is certainly not universal cognizance of them.

It has also been suggested by Professor Lewes that, on spontaneous firing taking place, it could be dealt with by the forcing of inert gases to the seat of the mischief, and so smothering the fire. But even the effectual smothering of a fire does not give any permanent assurance of non-recurrence. However, this reminds us of the recent proposal in connection with coal mining that, for obviating explosions in mines, the normal percentage of oxygen in the atmosphere should be reduced by the introduction of carbon dioxide in quantity insufficient to affect the working efficiency of the men. We have not heard of trials being made of this; but it supplies a link between the subject of spontaneous combustion of coal and explosions in mines. Professor Lewes's suggestion appears to be a practical one for the purpose of extinguishing fire in a coal heap; but the main point is the prevention of the trouble. Air currents among the coal must be avoided; and moisture is not wanted there unless the coal is absolutely sealed under water. Too great a height is not wanted in coal heaps, as the height helps in the creation of a greater circulation of air. However, we must not trespass further on the points made, and the suggestions incorporated, in the article elsewhere, either in connection with this matter, the deterioration of coal, or the construction of coal-stores. The article is suggestive, and brings to a focus various matters that bear upon these increasingly important subjects.

German Gas-Works Results.

A SMALL collection of German gas-works results in other columns are indicative of the progress of the gas business across the North Sea, and of the trend of developments there. There must be congratulation upon the expansion of business, which, in the five cities and towns referred to, ranges from 9·3 per cent. to 4·20 per cent. Our German friends, we rather think, are now reaping the fruits of the cultivation of the prepayment and cooking and heating lines of business, in developing which there was hardly the same alacrity shown a few years ago as in this country. In some of the cities and towns, differential prices enable us to judge of the immense influence that cooking and heating trading in gas is having upon the gas business. For instance, it is seen that at Marienburg, no less than 29·8 per cent. of the gas sold is used for these purposes; at Leipzig, 35·9 per cent. is consumed for heating and power; and Hof can boast of a consumption of 38·68 per cent. for heating and cooking. There is a point about the manufacturing operations that is interesting. We should not be surprised if the tendency of modern carbonization systems is not to cause German gas managers to make greater use of native coal, which seems to work extremely well in both vertical retorts and chamber settings. At Marienburg, no less a proportion than three parts of the coal carbonized is from England. The make of gas averages 11,411 cubic feet per ton of coal; the gross calorific value being 627 B.Th.U. If we turn to Leipzig, it is seen that only 2·08 per cent. of English coal is used; the remainder being native. Carbonized in ordinary horizontal retorts, the make is 10,639 cubic feet per ton of coal, while in chamber settings, from the same coal, there are produced 11,751 cubic feet per ton. In this case the average gross calorific value is 564 B.Th.U. The other works seem to have used German coal principally; and the working results are good. Experiences of this kind may lead to a gradual lessening of the demands upon this country for coal for gas-making purposes.

The Illuminating Expert in Street Lighting.

In several places where there has been competition between gas and electricity for street-lighting contracts, it has been observed that the electricity company or committee make use of an illuminating engineering expert who is able to act the part of special pleader for them. He carries out illumination tests, and as, like other specialists, he is retained to make out the best possible case for those who employ him, the electric-lamps, no matter their candle power, have always all the virtues on their side, and the gas-lamps make a pitiable show—on his paper. The electrical illuminating expert also prepares curves—most

wonderful curves—which are presented with due solemnity to the committee who have to adjudicate between the rivals. The committees understand just as much about them as they do about the hieroglyphics of Ancient Egypt. The reports also talk of candle-feet, candle-hours, and many other things that are understandable only among photometrists and illuminating engineers. As a matter of fact, there is a lot of mummery about all this, in view of the fact that those who have to settle street lighting contracts are not illuminating experts. Scientific appearance does not always represent scientific accuracy; but, at the same time, the scientific appearance of the case that is hurled at the heads of the unscientific adjudicators by the electrical folks, strikes some of the former as testifying to a superiority, as nothing of the kind has been submitted to them by the gas people. This growing practice of the appeal of the electricity suppliers to the special pleader and case preparer must be met by gas suppliers. When it is met, gas as a rule wins. Recently Doncaster had illumination curves (with modern lamps) and reports containing references to foot-candles and so on prepared by the Gas and Electrical Engineers; and gas won.

Height of Lamp Standards.

While talking of street lighting, it is interesting to observe how sometimes electricians' views clash with those of illuminating experts. A Committee of the Chicago City Council have been considering the question of the height of the street arc lamps. The scientific notions of the members of the Chicago Illuminating Society are offended by the 1000-candle power flame arc lamps being set so low as 25 feet; and they recommended the Committee of the City Council to ordain that their height should be changed to 30 feet, on the two grounds that the light would be better diffused, and that the source of light would be further above the line of vision of pedestrians. But the City Electrical Engineer was in favour of maintaining a height of 25 feet where the underground distribution system was employed, and 22 feet where the distribution system was overhead. The explanation is simple. The illuminating engineers and the electrical engineer do not consider the subject from the same standpoint. The latter knows something about light and the law of inverse squares; and he is perfectly conscious of the fact that the flame arc lamps will not look so showy, nor give such good illumination readings at any specified horizontal plane from ground-level, or at ground-level, if perched on a standard 5 feet higher. The Electrical Engineer gained over the Illuminating Society and their ideals; and at the moment the Chicago illuminationists are thinking that they are of those who have precious little honour in their own country.

Proposed High-Pressure Gas Lighting for Leeds Markets.

For some little time there has been keen competition between the Gas and Electricity Departments of the Leeds Corporation for the lighting of the Markets, in which at present electric arc lamps are employed. About six months ago, the Superintendent of the Gas Mains and Distribution Department of the Corporation (Mr. Walter Hole) prepared and submitted to the Markets Committee a scheme for the installation of some 80 high-pressure lamps of 1000-candle power, in substitution of the electric lamps. This aroused the Electric Lighting Committee, who vigorously opposed any change. But they were unsuccessful, as the Markets Committee, at their meeting last Wednesday, unanimously adopted Mr. Hole's scheme. Of course, this decision has to be confirmed by the City Council, who will have the subject before them at their next meeting; but, in view of the unanimity of the Committee, it is to be hoped the proposal will be sanctioned. Special interest attaches to this matter from the fact that, if gas is adopted, it will be the first instance, so far as we can remember, in which it has displaced the electric light in one of the large markets of the country.

A Thin Prospectus.

The public were during the past week invited to subscribe to a new Company, under the title of the Vacuum Electric and Gas Heating Appliances, Limited, and, by so doing, to enrich Mr. John Mann, the inventor of the vacuum electric water-heater, electric-flash boiler heater, and gas-flash boiler heater. But the prospectus itself does not give any encouragement for the belief that, by accepting its invitation, there will be any chance of speculators in the concern obtaining any great financial benefit from their action. The prospectus claims much; an examination of it for the purpose of finding the strength of the support to the claims reveals a very attenuated promise. There is no account of any business done; no ideas as to the profits likely to be made, except the "confident anticipation"—the kind of anticipation possessed by most inventors—that a certain number of the appliances will be sold annually, and that speculators in the Company should realize a dividend of 20 per cent. The results of the Company, it is predicted, are to be as generous as the claims put forward for the appliances. The expert views do not subscribe to one's confidence. A firm of chartered patent agents "think" that the appliances should be conducive to rapid and efficient results. Mr. P. Sylvester Fox is of "opinion" that the electric water-heater is a useful and efficient one; while the electric and gas urns "appear" to be satisfactory. Writing on June 19, Mr. E. H. Lancaster is "now" quite satisfied that Mr. Mann has a most satisfactory and efficient electric water-heater; but it appears that it is only if manufactured in quantities that the cost will allow it to be placed on the market at a competitive price. Among the vague statements of the prospectus is this: "Heaters can be supplied for the continuous warming of entire houses, &c., from £12 12s. (not including the necessary piping) at a cost for electricity from ½d. per hour." What the loose statement really means we do not know; can only guess. However, vacuum electric water-heaters seem to us to promise well in the production of a painful void in the balance-sheet. Out of the capital subscribed, Mr. Mann is to have, if the public swallow the prospectus, £15,000 in cash and £15,000 in shares. He will be lucky if he gets it.

High-Pressure Gas Distribution in Rhode Island.

In another part of the "JOURNAL" will be found an interesting addition to the literature of high-pressure gas distribution, in the shape of an article by Mr. C. W. Hunter, furnishing particulars of a high-pressure gas-distributing system carried out by the Stone and Webster Engineering Corporation of Boston (Mass.), with which he is associated. The Gas Companies at Pawtucket and Woonsocket, in Rhode Island, were concerned; and as the plant of the latter Company had become unequal to the increased demands upon it, the parties considered whether it would be better to reconstruct the works on a larger scale or to "feed" them from the Pawtucket works, fourteen miles distant. The problem was submitted to the above-named Corporation for solution. Financially, the "feeder" system certainly commended itself; but, as the author puts it, there were many "ifs" to be considered from an engineering point of view. The gas to be dealt with was made from Texas oil; and the question arose as to whether it would stand compression and transmission to the required distance. Then it was necessary that the supply should be absolutely reliable; and doubtless some hesitation was felt at making the supply, which was for a city of 45,000 inhabitants, depend upon a single main. However, after careful investigation, a high-pressure main was decided upon. For details of it and of the auxiliary plant, reference must be made to the article. It is scarcely necessary to say that great care was exercised in laying the main—every section being tested to 100 lbs. air pressure; and, in view of the penetrating power of the frost of a New England winter, it was well covered with earth. The result of these precautions is that the gas sustains only a small loss of illuminating power in transmission. It is sent out at a pressure of 26 lbs., and it is received at its destination at about 5 lbs.; the quantity passed with this loss being about 34,500 cubic feet. The system, which has been designed to provide for the next twenty years' output, was brought into use at the beginning of the year; and it is stated to have given remarkably little trouble. It is too early to speak of the financial results of the undertaking. It has, however, not only a present but a prospective value, inasmuch as it will serve as a base for future extensions.

The Other Side.

The autumn meeting of the Association of Chambers of Commerce of the United Kingdom, which will be held next week at Newcastle-on-Tyne, will follow well upon the proceedings at the Trades Union Congress, inasmuch as it will certainly effectively present "the other side of the picture." It is anticipated that the attendance will be a record one, and the forty or so resolutions which are to be found on the *agenda* should keep the delegates

busy. It is true that some of the resolutions have been passed by the Association on previous occasions, and so will merely come up formally. The new propositions, however, deal with several questions of great importance to the interests which the Association represents. Pride of place, in the number of resolutions devoted to it, is taken by the subject of labour; and this is not to be wondered at, for it is without doubt the most pressing problem by which the trading community generally are confronted at the present time. In addition to urging Chambers of Commerce to assist in the formation of voluntary Boards of Conciliation and Arbitration where these do not already exist, the London Chamber desires legislation to secure the right of employers to engage either union or non-union labour, to afford adequate protection to those who are willing to work, and to maintain freedom of contract between employers and employed. The banning of picketing in any form is sought by Leeds; while the Chamber for the South of Scotland would like to see strikes and lock-outs made illegal, and the substitution for them of compulsory arbitration. The suggestion comes from Liverpool that the Association should renew their efforts to obtain the appointment of a Special Commission to inquire into the provisions and working of the Trades Disputes Act; and Southampton, no doubt as the result of bitter experience of what "peaceful picketing" really means, also seeks the amendment of this Act. Then there is a proposition from the Glasgow Chamber that legislation should be brought about prohibiting, under penalties, general lock-outs or general strikes by those engaged in fuel production, transportation or communication, and public service utility, including railways, steamships, telegraph, and telephone lines, and gas, electric light, water, and power works, without due notice and opportunity for a public inquiry.

Points on Payment.

A point to which it is suggested the attention of company secretaries may be directed is referred to by Mr. F. D. Head, Barrister-at-Law, in the course of an article on payment by cheque, in the "Financial Times." Actions previously decided had, it seems, defined the principles underlying the law on the subject dealt with; and they are that creditors who send the customary request "for a cheque" do so at their own risk in the event of the cheque demanded falling into the hands of a fraudulent person, and that the request (unless the debtor is otherwise directed) implies a remittance through the post. In the most recent case, a Motor Cab Company were in the habit of paying monthly premiums to an Insurance Company by means of crossed cheques, when advised of the amount (which varied) that was due. On the particular occasion which led the parties to have recourse to the Law Courts, the Insurance Company wrote for a cheque for a certain monthly premium; and by inadvertence there was sent to them through the post an open cheque, which was fraudulently intercepted and cashed. It was not shown that there had been any request or agreement that an open cheque should be sent; and the Cab Company had to pay their premium over again. The author remarks that in the case of dividend or interest warrants the requisite authority for the transmission of the warrant by post is found in articles of association, trust deeds, in the debentures themselves, or in statutory regulations; so that if the warrant is lost and cashed fraudulently, the loss falls on the shareholder (though if it is lost and not cashed, a duplicate can be obtained on terms of indemnity). But applying the ruling in the Insurance Company's case just quoted, Mr. Head says "it would seem that a company which sent an uncrossed warrant or cheque would not be allowed to plead the 'posting equivalent to payment' doctrine, in the absence of an express agreement that such open cheque or warrant should be sent."

The Copyright of Government Papers.

The statement is made in a recent Treasury Minute that it has become necessary to define anew the practice to be followed with regard to Crown copyright, in consequence of the provisions of section 18 of the Copyright Act, 1911, which enacts that "Without prejudice to any rights or privileges of the Crown, where any work has, whether before or after the commencement of this Act, been prepared or published by or under the direction or control of his Majesty or any Government Department, the copyright in work shall, subject to any agreement with the author, belong to his Majesty, and in such case shall continue for a period of fifty years from the date of the first publication of the work." For the future, publications falling within certain classes will bear an indication on the title-page that the Crown copyright is reserved, the feeling naturally being that there is no reason why such works as are referred to, which frequently entail very considerable cost, should be reproduced by private enterprise for the benefit of individual publishers. Publications of the kind that come into this category are Army or Navy regulations, literary or quasi-literary works, and charts and ordnance maps. So far as certain other classes of documents are concerned, however, it is recognized that, as they are issued for the use and information of the public, it is desirable that the knowledge of their contents should be diffused as widely as possible; and in these cases no steps will ordinarily be taken to enforce the rights of the Crown in respect of copyright. At the same time, such rights will not lapse, and should exceptional circumstances arise, they may be asserted. The publications which will be subject to the general rule permitting full and free reproduction are divided into four classes: (1) Reports of Select Committees of the two Houses of Parliament or of Royal Commissions; (2) Papers required by Statute to be laid before Parliament; (3) Papers laid before Parliament by command; and (4) Acts of Parliament. In these classes are included such documents as rules made by Government Departments, accounts, reports of Government inspectors, reports of inquiries into explosions or accidents, and other special reports made to Government Departments.

THE RECENT FLOODS AND GAS SUPPLY.

THE past month will undoubtedly occupy a prominent place in meteorological records as a period of practically incessant rainfall; and the early days of the last week of it will long be remembered, especially by the inhabitants of the Eastern Counties, for the deluge which visited them, rendered so many temporarily homeless, and caused so much destruction to property. While accounts have been reaching us of bridges being destroyed, railway lines so damaged as to necessitate the suspension of traffic, and streets submerged to the extent of several feet, it is gratifying to find that in no case has the supply of gas been cut off.

As readers of the daily papers are aware, Norwich suffered severely from the heavy rainfall. The water made its way into the electric light works, and so interfered with the working of the dynamos that by nine o'clock on Tuesday night the light failed, and a large part of the city was in darkness. No current was available on Wednesday or Thursday; but on Friday evening current was furnished from a private installation. It was hoped that there would be a good supply from the Corporation works on Saturday night.

At Leicester there were some distressing scenes on Monday night; several miles of streets being flooded to the depth of 3 feet. The gas and electricity works had a narrow escape. A number of men rushed with bags filled with sand, and built a barricade at the entrance to the works; but it was soon surrounded with 3 feet of water.

At the Stowmarket Gas-Works, the floods extinguished the retort fires; but there was fortunately a good supply of gas, so that there was no danger of the town being in darkness. The residence of the works foreman (Mr. Kerry) was flooded.

Fortunately in the latter part of the week the waters subsided; and the flooded streets of Norwich began to assume something of their customary appearance.

FIGHTING THE DELUGE AT NORWICH.

Mr. Thomas Glover, the Engineer of the Norwich Gas-Works, has forwarded the following account of the experiences in connection with the maintenance of the supply of gas by the undertaking of which he has charge.

A great deal of public notice has been given to the effect of the floods in the Eastern Counties, and particularly of the disastrous effects produced on the City of Norwich. It may therefore interest your readers to have a few facts as to the effect on the gas-works, and what measures were taken to maintain an uninterrupted supply of gas to the city.

Owing to the very heavy rains on Friday and Saturday, Aug. 23 and 24, and, particularly, on Monday, Aug. 26, when 7 inches of rain fell in twelve hours, the Rivers Wensum and Yare rose to abnormal levels. Especially was this the case with the River Wensum, on a bend of which the gas-works are situated. The river serves the useful purpose of enabling coals to be delivered by water, and of permitting the shipment of tar, liquor, and other residuals; and its normal level is some 6 or 7 feet below the quay-heading at the works. The rising of the waters was watched, as can be imagined, with great anxiety, and prompt action was taken by placing beams of timber along the quay-heading to a height to which it was not expected the flood waters would rise. All inlets to

the river which usually serve as drains from the yard were blocked with bags of clay-puddle; brick-dams were hurriedly constructed to the entrance of the retort-house basement and boiler-house; and sump-tank covers were sealed down. But the pressure of water, and the unusual height to which the waters rose, rendered these precautions of little avail. The boiler-house, mechanics' shops, pump-house, and basement were flooded to a height of 2 ft. 5 in. above the yard-level. There was, therefore, no steam available for the usual operations of pumping or for water-gas manufacture, and other purposes.

The coal-store floor and elevator-pits became flooded—water coming in through most unexpected places, through concrete floors, and even through brickwork set in cement. It was impossible to raise coal to the hoppers for the machine stokers, and lifting coal by hand from the coal-store to keep the machines going was found to be slow and tedious work, and resulted for a time in a reduced manufacture of coal gas. Progress about the yard had to be made on hastily erected gantries; and a steam-roller and two traction-engines were requisitioned for supplying steam to pumps and such purposes. A fire-engine, kindly lent by the Corporation, enabled us to clear the basement of the retort-house; and spare pumps, in possession of the Company were fixed for pumping out the elevator-pits, belt-races, and boiler-flues.

The flood was at its greatest height early on Wednesday morning; the water-level being 9 feet above normal river-level. The stock of gas in the holders, together with the reduced manufacture, enabled us to maintain a full supply, though the stock was reduced to a very small figure by Thursday evening, when we were able to restart the water-gas plant and get the full work from the coal-gas plant. We were greatly helped in our difficulties by the fact that the power for the stoking machinery was obtained from a gas-engine, and also that the exhausters and boiler plant at the Bishop Bridge works were not affected.

On the district over 1000 street-lamps were lighted every night; and as these happened to be in the districts worst affected by the flood, they proved of no little advantage to those effecting rescues of poor people from bed-room windows.

Meters in factories, and in small houses, were floated, and connections were broken; but happily, though several serious escapes occurred, these were promptly attended to, and no disastrous results followed. It is estimated that about 3000 meters will require attention, and a large staff are now engaged in putting these matters right. Several bad subsidencies took place, which necessitated mains being disconnected; but in no case did the escaping gas become ignited.

Many anxious inquiries were made at the office and works as to the likelihood of the gas supply continuing; but we were in a position to assure our consumers that the supply would be maintained, and this, I am happy to say, proved to be correct. Throughout this time of great pressure and anxiety the men behaved in a most loyal and faithful manner, many of them working for several days and nights without any real interval for rest.

The local paper, which is printed by means of metal type melted by gas, both for the linotype machine and in the foundry, derives its power in the usual way from an electric motor; but a supplementary gas-engine was brought into use, and by this means not a single issue of the paper failed to appear. A number of factories which derive their power from gas-engines likewise were able to continue running, while others, where electricity is employed, were shut down for several days.

Great praise is due to members of the staff, and particularly Mr. Harston (Assistant Manager) and Mr. Wayte (District Superintendent), for the prompt measures taken, and so avoiding many disastrous results.

North British Association of Gas Managers.

We have received from the Secretary and Treasurer (Mr. Lawrence Hislop, F.C.S., of Uddingston) the programme of the fifty-first annual meeting of the North British Association of Gas Managers, which will be held in the Marischal College, Aberdeen, on Thursday, under the presidency of Mr. Samuel Milne, the Gas Engineer of the Aberdeen Corporation. At the opening of the proceedings, the Lord Provost (Mr. Adam Maitland) and the Convener (Mr. John A. Sangster) and members of the Gas Committee will be present, and extend a welcome to the Association. After the usual routine business has been disposed of, the President will deliver his Inaugural Address, and the reading and discussion of the following papers will be taken up:

"Governors: Their Action and Application," by Mr. W. Carmichael Peebles, of Edinburgh.

"A Year's Work with Vertical Retorts," by Mr. William Blair, of Helensburgh.

"Automatic Gas Lighting and Extinguishing," by Mr. George Keillor, of Broughty Ferry.

"Some Notes on Lighting Appliances," by Mr. S. B. Langlands, of Glasgow.

After the adjournment for luncheon, Dr. Harold G. Colman will deliver the Inaugural Lecture under the William Young Memorial Trust; the subject being "Carbonization." At the close of the lecture, the remainder of the technical and general business will be dealt with. In the evening, the members and their lady friends will dine in the Town and County Hall in the Municipal Buildings, on the invitation of the Corporation; and on Friday there will be an excursion to Ballater and Braemar.

ELECTRICITY SUPPLY MEMORANDA.

Fusings and Musings—Suspended Danger—Experimental Cooking at Harrogate—Limiting Financial Indiscretion—Petty Arguments from Harrogate—Attacking Nature's Beneficent Schemes for Mankind—At the Sign of the "Queen's Head"—Fatalities.

THERE will have been a good deal of musing over electric-wire fusing during the past week, as a result of London finding its means of telegraphic communication with the outer world cut off through an electric wire fusing, on the evening of the 24th ult., in the system of the Central Telegraphic Office of the G.P.O. There has been a disposition to minimize the event; but one has only to read between the lines of the reports, and to piece together the intelligence that has been allowed to leak out, to realize that there was genuine alarm, and that for a time the pile of buildings was in real jeopardy. The occurrence will assist to bring home to people that fusings of electric wires occur at the most unexpected times, and in the most unexpected places—Government buildings and the country's services not being exempt from the uncertainty. This particular fusing occurred in the most vital part of the system in the building. It is stated that the wires leading from the power room in the basement of the establishment to the test-box fused; thus cutting off the power from the rest of the place. It was the old tale. First bluish smoke was seen emanating from the top of the building; and then there was a perfect cloud. Sand was flung into the box in which the fire was "raging;" but the flames for a time refused to be extinguished. The smoke increased in density; and the fumes from the burning insulation were suffocating. These are statements from the reports; and they are sufficient to show the seriousness of the occurrence, whatever toning-down of the reports may have been the natural official desire. However, the Post Office authorities have well in mind the possibility of a big fire, and have an elaborate scheme in hand for coping with any such eventuality. The fusing of last Saturday week, with its effects, will perhaps serve the excellent object of giving a fillip to the consummation of their plans. There is no doubt about the authorities having had a big shock.

In the City, the Corporation authorities are still doing their best to get rid of overhead wires. In certain parts of the country, electricity suppliers are doing their best to get authority to save electricity distribution expenses by carrying wires overhead instead of underground. When carried underground, electric wires are a source of danger, as witness, among other troubles, the Long Acre suffocation cases, and the Strand, Nottingham, and Piccadilly explosions. When carried overhead, the violence of the elements is constantly threatening the stability of the wires, and, through them, life and property. The other day an electric cable was broken by a storm between Dingwall and Strathpeffer Spa. A child touched the live broken wire, and was killed. The mother saw the child fall, ran to its assistance, and, inadvertently touching the wire, she also came to an untimely end. Nottingham had another illustration of the dangers of electrical transmission on the 19th ult. During a thunderstorm, the tramway electric cable, which was apparently struck by lightning, collapsed in Parliament Street. The live cable as it fell caused a noise like an explosion; and there was also a flash that looked like a sheet of flame. Fortunately, the severe storm had cleared the street of people, and no one was injured. But this trouble with an aerial electric wire succeeding the trouble with the underground one which wrecked an hotel in the city, and did personal damage (for all of which the Electricity Committee have had to pay), have given the people of Nottingham a couple of ugly shocks. Taking all things into consideration, perhaps underground wires, where practicable, are to be preferred; and when there is no other reason for overhead suspension than the saving of a proportion of capital expenditure, the authorities ought to emphatically refuse ever to sanction them. Besides this, few people other than electricians want to make our towns and villages, and the countryside generally, hideous by the presence of overhead wires.

The Corporation Electricity Department at Harrogate has shown considerable enterprise in the past; and a few original things have been done in connection with it. The Council have just decided that £200 shall be set apart out of the profits of the electricity undertaking for the purpose of developing the heating and cooking business. This is not original, because the Brighton Town Council not long since decided to take £250 out of the reserve fund of their Electricity Department to spend on electric cooking sets; the object of having recourse to this source of funds being that low rents might be charged for the cookers. There is no particular harm in all this, providing it does not go on indefinitely. Parliament never intended that the lighting consumers of any electricity undertaking should bear the burden of what is a legitimate capital charge. As we have before pointed out, low rents for electrical apparatus and low prices for the energy used in such apparatus, will not go well together. Electric-cookers are the direct opposite of gas-cookers. The former are much more expensive, more costly to fit up, there are heating elements to renew, and replacement after a comparatively short life to be considered. The utensils for use on them are more costly. In Mr. Holmes's paper at the recent meeting of the Municipal Electrical Association, he estimated from his experience what these costs are likely to be; and the Harrogate councillors should consider them before they allow anything to be done beyond this initial expenditure. Otherwise, they may find themselves in a bit of a muddle, with

a lot of cooking apparatus on hand that has cost a good round sum, and the general conduct of which has led to their rejection by the consumers. It is no use judging of these matters during the day of novelty; the novelty has to wear off, a few dinners have to be spoilt by wire fusing or some other cause, the total expense has to be felt by the consumer—not the expense of baking a joint only, but the large expense of cooking and heating water and doing other things in utensils on the top plate, as well as the expense for renewals. The people of Harrogate have only heard half the tale. There is, as the "Harrogate Times" has truly said, much to do to prove that these things can be done as efficiently and economically by the electric-cooker as by gas or coal, seeing the low calorific value that has been permitted as a property of electricity, compared with the agents with which it has to compete. The Harrogate councillors, as business men, must look thoroughly into this matter before exceeding the piece of experimental speculation; and they must see that the financial statement that is presented to them as a result of the trial includes all the expenses incurred—purchase and installation, repair and renewals. It is their business to do this; for as the "Harrogate Times" remarks "on no account must something be given to the consumers for 11d. that actually costs 1s. to supply."

We have been amused by a letter upon the subject that has appeared in the same contemporary from the pen of Mr. Wesley Petty. We do not know Mr. Petty; but he has absorbed pretty easily and readily the platform tales of the agents of electric-cooker makers. The leg of mutton shrinks according to Mr. Petty twice as much in a gas-oven as in an electric-oven; and he puts the saving by the latter down to the fact that it contains no flues or pipes, and no escape of any sort. The good Mr. Petty has only been told part of the story. There is one flue opening in the gas-cooker; and in the gas-cooker food can be cooked in an enclosed tin—making the conditions precisely those obtaining in an electric-oven such as Mr. Wesley Petty has in mind. Now some makers of electric-ovens do not put a ventilating-flue in them, because the oven cannot afford to part with heat this way, as in the case of the gas-oven. In such electric-ovens, pastry and other things that require to be done to a crisp condition cannot be cooked while the oven is full of steam from the joint of meat. Other makers of electric-ovens *do* provide ventilating-flues; and some cooks who use electric ovens say this is wise. What has Mr. Petty to say to those makers and cooks? But suppose meat is not cooked in an enclosed tin in a gas-oven, and suppose equal temperatures are used in gas and electric ovens, and joints only cooked to an equal degree, what, under these circumstances, does Mr. Petty find that should make the gas-cooked joint shrink to such a frightful extent as he states, and why, under such circumstances, should the joint come out of the electric-oven looking almost bigger than before it went in? This bloated appearance of an electric-cooked joint is the product of a strained imagination. After a joint has been made to give up a considerable proportion of its water content in the shape of vapour, there must be some serious defect about a person's vision to whom that joint looks almost bigger than before.

Mr. Petty also overlooks the fact that joint baking is only a small factor in the work of a cooker. What has he to say about all the rest of the cooking and boiling that constitute the needs of a household. It is absurd to look upon this matter from any single point of view. Mr. Petty also appears to think that heat electrically developed and heat developed by other means have some mysterious difference in their effect upon the flavour of the meat. Differences in the flavour of meat must surely be due to some inherent characteristic of the meat, and not to any outside influence. Then Mr. Petty passes the limit of any sane consideration of the subject of gas heating when he speaks of the bedroom gas-fire being "a dire and dreadful oxygen destroyer." Such a statement epitomizes ignorance. We wonder that he does not go a step farther, and roundly abuse Nature for having given the people of the earth the coal by which such a large amount of the heat required by them—including electricians for their central generating stations—is provided, and which coal requires oxygen for its combustion; and then return to the charge for having given the people of the earth gas as a purified product of that coal. It is a pity, so far as the electrical industry is concerned, that Nature did not take Mr. Wesley Petty into counsel in her beneficent schemes. But if Nature had done so, there might have been some oversight in devising the remarkable system of things that provides all the oxygen required for utilizing Nature's gifts, and that methodically replaces it. Would Mr. Petty be surprised to learn that scientific exploration in matters which he does not understand teaches that, even though there may not be sufficient oxygen in the atmosphere of an enclosed space to support flame, there may still be more than is requisite to support human existence. There is much more that can be said on this subject; but really one sometimes reaches the limit of patience in dealing with petty and ignorant talk like that in the letter before us.

The electrical papers have given another puff to the Queen's Head Electric Restaurant at the Shakespearian Exhibition; and comparing the accounts in the various papers, it is safe to say that they originated from the same head and hand. An account, under the title "At the Sign of the Queen's Head," appeared in the "Memoranda" some weeks ago of a visit paid to the electric restaurant; and it seems quite probable that this visit was paid at a time before the electric apparatus was changed, for changed it has been. This is what is stated in reference to the matter. "The manufacturers supplied apparatus from stock, mostly of the domestic type, and although this apparatus worked satisfactorily, it was found that it was not suitable for restaurant purposes, owing to its not being capable of meeting the *large* simultaneous demands for grills, &c." The first puffs as to the working of the restaurant placed alongside this statement show that there is sometimes misplaced confidence even on the part of electricians. However, everything has been running well since the change, so the electrical reporter states; and the demand for electrically cooked food has been wonderful. A typical two hours' demand for grills (which is no doubt about the maximum demand ever experienced by the restaurant) consisted of rump steaks, 24; fillet steaks, 12; loin chops, 20; chump chops, 8; cutlets, 46; kidneys, 20; tournadoes, 18; ham, 4; sausages, 12; salmon steaks, 17; soles, 3—total 184. It will be observed that about two-thirds of the articles were of the small kind; yet the consumption of current per grill worked out to between one-quarter and one-third of a unit. Assuming that the best of the case is presented here, and that we shall not be doing an injustice in taking the over-all consumption at one-third unit per grill, then it is found that the two hours' work upon the 184 subjects (nearly two-thirds of which were, as we have said, of not very large character) meant an expenditure of about 60 units, which, at 1d. per unit, represents 5s. We wonder what Messrs. Lyons and Co., or some of our other large caterers could do in two hours on a gas-grill consuming in that time (say) 2500 cubic feet at 2s. per 1000 cubic feet. There is good ground for the belief that this little boast of our electrical friends will cause a few smiles in the kitchens of our West-end hotels and restaurants where are told the experiences of the Queen's Head Restaurant, as related, in the best colours, by our electrical friends.

Quite a crop of electrical fatalities has been reported recently in the electrical papers, some of which papers usually show a very lively disposition to give special prominence, other than a mere news paragraph, to fatalities where gas is concerned. Just as the gas industry suffers from the negligence and carelessness of workmen who violate the most elementary rules and precautions, so the electrical industry suffers in reputation through fatalities occasioned by men who treat with contempt the precautions that they are requested to observe. We do not know, however, that this can be said of a poor fellow named George Henry Gibson, who met with his death lately while working in a cable manhole at Failsworth. He had previously been cautioned against breaking the regulations by not wearing rubber boots when on such work; but it does not transpire that there was any infringement in this regard on the day of his death. Death, the jury found, was due to shock and suffocation—the result of an electrical shock. Within three hours after the occurrence, the cables were tested; and the voltage was found to be 240—the normal voltage, and one that is common on private consumers' premises. The wire-works of Messrs. Johnson and Nephew, at Manchester, were recently the scene of the death of a young and newly married man, who received a shock while repairing a motor. He had not taken any of the ordinary precautions that he should have done. Also lately a man was killed and another one was severely burnt at Messrs. Renton and Fisher's engineering works at Bathgate, through a crane coming into contact with a live wire. At Wallsend, the body of a boy was found badly burnt and life extinct—a live electric wire having been the cause. Particulars are not to hand, but probably this was a wire at high pressure. Working at the Glebe Colliery, Fenton, a gang of men were putting an iron girder in position when it came into contact with an electric-wire from which the insulating material was rubbed. A 500-volt current went through the unfortunate men to earth. The foreman, who was standing on an iron plate, was killed; the other men escaped fatal injuries. In a different category is the death of a man employed by Messrs. Blakewell and Co. This happened while repairing an overhead wire on the electric railway near Tulse Hill Station; the man's hand coming in contact with a live wire, causing instant death.

Prizes for French Gas Manuals.

The Committee of the Société Technique du Gaz en France have announced their intention of offering three money prizes, each not exceeding £40, for the best manuals for the use of (1) general or retort-house foremen in works producing a maximum of 350,000 cubic feet of gas per day, (2) outdoor superintendents in connection with works of similar capacity, (3) chiefs of the lighting service in towns having less than 50,000 inhabitants. The Committee desire special attention given to the following points: Precision, clearness of diction, practical particulars in regard to the service, the regulation of the plant, and the every-day details of a well-conducted establishment, the work to be done periodically to ensure proper upkeep of the plant and efficient supervision, advice as to the best time for carrying this out, and the keeping of daily records of work. The manuals must be the personal productions of the authors, and not have been published; and they will remain in the custody of the Society. They must be sent to the offices, No. 94, Rue St. Lazare, Paris, before Feb. 1 next. The authors are interdicted from publishing anything on the same subject before the expiration of a year. The prizes above referred to are in addition to those regularly offered by the Society for improved apparatus connected with the manufacture and use of gas and the utilization of coke, for the best technical papers, and for meritorious service by workmen, particulars of which have been given from time to time in the "JOURNAL."

PERSONAL.

Mr. Robert Wilson, Solicitor, of Sanquhar, has been appointed to the posts of Secretary and Collector of the Kirkconnel Gas Company.

Dr. George T. Beilby, F.R.S., has been appointed a member of the Royal Commission on Oil Fuel for the Navy, in place of Mr. H. Owen Jones, the Cambridge lecturer, who with his wife was recently killed on Mont Blanc.

At the meeting of the North British Association of Gas Managers on Thursday, Mr. R. G. Shadbolt, the Past-President of the Institution of Gas Engineers, will be proposed by the Council for admission as an honorary member.

Out of forty applicants, Mr. James Mitchell, Assistant Engineer at the Dundee Gas-Works, was, at a meeting of Directors on Thursday afternoon, appointed Engineer and Manager of the Montrose Gas-Works, in place of Mr. A. Mackay. Mr. Mitchell is 30 years of age, and elder son of the late Mr. Robert Mitchell, Gas Engineer and Manager at Edinburgh. He was trained as a mechanical engineer with Messrs. Brown Bros., of Rosebank, Edinburgh, and also as a practical engineer and draughtsman with Messrs. James Milne and Sons, of Edinburgh. Prior to going to Dundee, he was Joint Manager of the Gas Department of the Ardrossan Corporation; and he has had a varied experience in the erection of gas plant of all kinds.

In response to an invitation contained in the "Journal" for the 2nd of July (under No. 5601), there were 94 applicants for the position of Resident Engineer for a Gas Company within a short distance of London; and, as announced in the advertisement columns last week, under the same number, a short list was made. The Enfield Gas Company was the one referred to; and Mr. Robert Wardell, at present Assistant Engineer to the Cambridge Gas Company, has obtained the appointment. The successful candidate is a member of the Eastern Counties District Association; and it may be remembered that at the last meeting he read a paper on "The Efficient Running of Gas-Engines." We congratulate him heartily, and wish him success in the discharge of the duties he has been chosen to undertake.

OBITUARY.

The death took place suddenly last Sunday week at Carr Bridge, of Mr. Thomas Aitken, an ex-Provost of Leith. He entered the Town Council in 1884, and in 1887 was unanimously chosen Provost, which office he held for six years. One of his first actions as Provost was the signing of the agreement for the acquisition of the Gas Company's undertaking by the Edinburgh and Leith Corporations.

Mr. William Blackstock, Secretary to the Manchester Corporation Water Committee, died suddenly last Friday morning, in his 74th year. He was at business as usual the previous day. Mr. Blackstock was one of the oldest members of the Corporation staff; his service dating back to 1866, when he was appointed shorthand clerk in the Water Department. His election to the post of Secretary took place in 1894.

In the report of the proceedings at the half-yearly meeting of the South Staffordshire Water-Works Company which appears elsewhere, it is mentioned that Alderman Charles Gabriel Beale, the Chairman, was unable to preside on account of illness. We regret to announce that he died at his residence in Birmingham, on Sunday, at the age of sixty-nine. He had been for some years on the directorate of the Company, and became Chairman early in 1908, on the retirement of Mr. Frank James. Alderman Beale was a member of the firm of Messrs. Beale and Co., of London and Birmingham, Solicitors to the Midland Railway Company. He was Lord Mayor of Birmingham in 1897, and filled the office for three successive years, during which period he established a record in respect of public generosity; the various funds raised under his supervision amounting to more than half-a-million sterling. Deceased leaves a widow, two sons, and two daughters.

We greatly regret to have to report that on the 22nd ult. the death occurred, after a long illness, of Herr Rudolf August Ritter von Oldenbourg, the head of the publishing house of "R. Oldenbourg," of Munich, by which our contemporary, the "Journal für Gasbeleuchtung," and the majority of works dealing with gas and water supply in the German language, are published. Deceased was born in 1845, his father being partner in a publishing house at Munich until he joined the son in 1868 to found the independent business of "R. Oldenbourg." The son had been trained at a publisher's at Giessen and in Paris. In 1890, the father retired, leaving deceased and two brothers in partnership. The business of the firm now gives employment to about 450 persons. Perhaps its greatest undertaking has been the publication of the "Illustrated Technical Dictionary," in six languages, of which eleven volumes have already appeared. Deceased had held the rank of Captain in a German Cavalry Regiment, and had served in two campaigns. In 1881 he was appointed Italian Consul; and when he gave up the appointment in 1908, he was nominated Honorary Italian Consul General. He was given the rank of Commercial Councillor in 1886, and had received many other distinctions.

THE STORAGE, DETERIORATION, AND SPONTANEOUS COMBUSTION OF COAL.

By Almea.

At the present time, when the majority of gas companies are hurriedly regaining their stocks of coal depleted by the recent strike, the question of the storage and deterioration of coal will command a certain amount of interest. It seems probable, too, that, owing to the somewhat unsettled state of the labour world, the coal in future held in reserve at gas-works will be far in excess of the amount hitherto considered sufficient; and that the usual standard of six weeks' working requirements is inadequate is clearly indicated by the protracted labour disputes which have occurred within the last twelve months.

As a whole, the question of coal storage does not, perhaps, receive the share of attention it deserves. The arrival of coals at a gas-works being almost an every-day occurrence, their disposal is not considered of any great consequence, with the result that more often than not they are tipped down haphazard at the nearest available spot. The complexity of the actions taking place in the coal stack is not usually appreciated until the views of engineers and scientists who have studied the subject have been referred to. Then it is that the divergent opinions of the numerous authorities enable one to realize that there is a great deal more in the familiar heap than is revealed by outward appearances. The precise cause of spontaneous combustion and the means of preventing it, for instance, are problems around which many theories have been woven; and the impression left behind after an attempt to reconcile the various opinions is one of perplexity and scepticism somewhat akin to that which remains after reading those works of Dickens in which he dilates upon the probability of spontaneous combustion attacking human beings who form an excessive attachment for alcohol. In the present article, it is proposed to consider, firstly, the liability of coals to spontaneous combustion, with the means of preventing this, and, subsequently, various methods of storing and the deterioration due to it.

Spontaneous Ignition.

The problem of the spontaneous combustion of coal is one which the gas engineer is continually called upon to face, owing to the fact that the bituminous coals used on gas-works suffer most in this respect, whereas cannel coals are less affected; steam coals and anthracite being least liable of any. Originally, there was a general opinion among gas engineers that spontaneous ignition was due to the oxidation of the "brasses" or pyrites in the coal, and that the action was greatly accelerated by damp and moisture; the pyrites being oxidized by the oxygen contained in the water. This idea probably originated owing to the fact that if a quantity of pyrites is picked from the coal, made into a heap, and then exposed to air and moisture, the heat of the pile rapidly rises, owing to the oxidization of the sulphur due to the action of the air and moisture. In many cases a temperature will be reached at which combustion in air begins, and the mass will then burst into flame. In contradiction of this theory, however, it must be pointed out that while some coals containing a very high percentage of pyrites are quite safe, those containing a small proportion often give great trouble when stacked.

There seems to be little doubt, then, that spontaneous combustion is the outcome of a combination of several causes, and that while pyrites itself is not alone responsible, it plays some subsidiary part in assisting the action. Factors such as the size, dampness, proportion of volatile matter, and general composition, all play their part in bringing about a rise in temperature. It is, however, interesting to note that the conclusions recently arrived at by the United States Bureau of Mines were that moisture plays no part in promoting spontaneous heating, and that high volatile matter does not of itself increase the liability to fire.

It is common knowledge that coal as soon as it leaves the seam has a great avidity for oxygen, and, remarkable as it may seem, the greater the proportion of oxygen in combination with the coal the greater appear to be its proclivities for absorbing an additional quantity from the air. Professor V. B. Lewes, in one of his recent Cantor lectures, pointed out that the "resin bodies are the compounds present in the coal most likely to possess this property. It is the chemical actions so caused which lead to slow combustion, and, when accelerated by any rise in the surrounding temperature, this is capable of generating sufficient heat to lead to the spontaneous ignition of masses of broken coal large enough to prevent the escape of heat as it is developed." Many bituminous coals will absorb more than three times their volume of oxygen; but after a time they get coated with an oxidized surface, and their absorptive properties become less vigorous until new surfaces are exposed by the breakage of lumps, &c.

It is probable, then, that the cause of spontaneous heating in coal heaps is due to the rise of temperature occasioned by the oxidation of part of the carbon together with the sulphur in the coal; and in cases where actual firing takes place, it may be assumed that the heat generated in the stack is greater than that dispersed by radiation. Thus the temperature rises till the ignition point is reached. The greater liability of some coals to fire is due, therefore, not to the sulphur they contain, but to their proclivities for absorbing oxygen; and the greater the quantity of oxygen absorbed, the greater will be the tendency to fire. The

heating effect, too, is probably cumulative; for a rise in temperature increases the capacity of the coal for taking up oxygen.

Prevention.

On the question of the actual cause of spontaneous ignition there is a certain amount of uniformity among the opinions expressed; but unhappy is the man who seeks advice as to the best means for preventing its occurrence. Probably there are few matters on which so many divergent views have been volunteered; and authorities on the subject (particularly in Germany) appear to make a practice of bringing forward a host of contradictory opinions whenever the subject comes up for discussion. For instance, turning to the reports of the German Gas Association, we find a Mariendorf engineer strongly advocating ventilation as a means of preventing ignition, whereupon up jumps a brother engineer with the suggestion that ventilation actually causes fire. Again, it is noticed that the New South Wales Commission on the Spontaneous Combustion of Coal in Bulk recommend a "free use of the hose pipe;" whereas another authority points out that the use of water is likely to be followed by serious results and possible explosion, especially in confined stores. Primarily, then, it is necessary to find out the conditions actually favourable to combustion; and, in the first place, there seems little doubt that there is far greater liability in hot weather than in cold.

With regard to the question of ventilation, many opinions have been expressed; and some few years ago it was quite a regular practice to resort to such expedients as perforated iron pipes, wickerwork baskets without bottoms, also elaborate ventilating shafts of brick and wood, so as to ensure the passage of a good strong current of air through the heap. Great caution, however, is necessary, for it must be borne in mind that when once a fire has been created it will not continue to burn unless the supply of oxygen is maintained; and very often the ventilating shafts, by the formation of a draught, supply the necessary oxygen for sustaining and augmenting the fire. Unless ventilation is through, therefore, it is liable to cause great mischief. Perhaps, taking everything into consideration, it may be wiser to adopt surface ventilation only.

Owing to the greater tendency of some coals to fire, it is as well to keep the various classes in distinct heaps as far as possible. Experience has shown that it is inadvisable to stack all the large coal in one heap; for probably, owing to disintegration, a "dust-pocket" will be formed somewhere towards the bottom. The spaces between the lumps afford excellent opportunities for the creation of a draught, and, consequently, a steady supply of air to the pocket. In such a case, we get conditions similar to those occurring with insufficient artificial ventilation. The heap should be piled so that lump and fine are distributed as evenly as possible. A point which usually escapes observation is the tendency of the large lumps (when tipping on the apex of a heap) to run to the outside, leaving the centre of the heap composed of slack. This is undesirable, and the coal should be spread out as the heap is built up. English coal spread out in this way was stacked at Berlin to a height of 46 feet for more than twelve months, and no trouble was experienced with it.

The depth of the heap is another point which has received a good deal of attention. According to information available, it appears that there is some relation between the liability to spontaneous combustion and the height and volume of the heap in which it occurs. There also appears to be a "critical height" above which it is inadvisable to go, and for ordinary coals this ranges between 15 and 20 feet. Excessively high heaps should, of course, be avoided as far as possible, for pulverization is sure to take place towards the bottom.

Dealing with a Burning Heap.

The undue heating of a coal heap is usually accompanied by "steaming" and an offensive smell, due to the escaping hydrocarbon vapours. When these are noticed, the usual procedure is to turn the hose on to the apparent seat of the trouble and drown out the fire. When a fire does occur, however, it is necessary to avoid the use of water until the actual affected area has been located. The coal round about this area should then be dug out, and the smallest possible quantity of water made use of. By far the best practice is to get the affected coal away to the retort-house and carbonize it as soon as possible.

A coal heap should be kept continually under observation, and the most usual means of recording the temperature is that of inserting 1½ to 2 inch pipes, one end of which has been knocked down to a point. A thermometer—attached to a cord—can then be lowered into the pipes and the temperature noted. As the drop in temperature while the thermometer is being withdrawn is likely to be somewhat considerable, a more accurate reading will be obtained if a maximum thermometer is used. When greater accuracy still is required, it is necessary to use a low-temperature pyrometer with electrical connections. A great deal of trouble will be saved if the temperature pipes are suspended in position before the heap is made, for the task of forcing them down into an existing heap is certainly tedious.

A new idea from America is that of a coal auger, the head of which contains a small maximum thermometer. It is claimed that the point of the auger can be driven 20 feet in from three to five minutes, and about ten minutes is required for the thermometer to attain the temperature of the surrounding coal. Temperatures taken in this manner have been found to be 40° higher than by the pipe method—the difference being ascribed to the circulation of air in the pipe. When the temperature rises above 90° Fahr., the upper layers of coal at least should be removed. Disturbance of the heap by driving in rods, &c., to the seat of the fire should be avoided, for this merely has the effect of inducing air currents, and hence provides an additional supply of oxygen.

When a fire actually breaks out, some prefer the use of sand to that of water, for, while water cools the material and reduces the temperature below ignition point, sand smothers the fire and cuts off the supply of oxygen. Sand certainly recommends itself for use in cases in which the action of water is known to have a deleterious effect upon the surrounding coal. If the fire were large, however, it would probably afford but little check.

Vertical Retorts and Wet Coal.

That damp coal has an undesirable effect when carbonized in ordinary retorts is indisputable; but in works in which there are chamber-ovens or vertical retorts, the moisture matters but little. Accordingly, the dry coal could be reserved for the horizontal house, while the wet coal could be disposed of in the verticals. For some unexplained reason, certain coals prove themselves particularly liable to spontaneous combustion when under a covering of snow. Occasionally fires have been caused by hot pipes which run through the heap or under the ground upon which the coal is stacked. Thus it appears that a very small source of external heat is sufficient to set the action on foot, especially if it is local and applied towards the centre of the mass.

Another point is that of the local application of water. While a shower of rain seems to have little effect, a stream of water confined to one small area will probably cause a rise in temperature. This is best illustrated by the case of the covered coal-store with a leaky roof, and the fact that fires frequently occur directly under the leak. Leaky water-pipes in the vicinity of the heap very often lead to trouble. Finally, for the prevention of heating, and for the treatment of fires, the writer suggests the following points:—

1.—Stock different types of coal in separate heaps.
2.—Surface ventilation only.
3.—Mix lumps and fine together. Small heaps are less dangerous than large ones.
4.—Do not pile to a greater height than 20 feet.
5.—Avoid external sources of heat, such as hot pipes.
6.—Attend to leaky water-pipes or gutters in the vicinity of the heap.
7.—When temperature rises to 90° Fahr., remove top layers and carefully watch.
8.—Do not disturb the fire by pushing in bars, &c., from the side of the heap.
9.—Apply water to the seat of the trouble only, particularly if fire occurs in confined stores.
10.—Remove and carbonize the affected coal as soon as possible.

Deterioration.

The deterioration of coal due to storage is another vexed question; and though all are agreed that some loss does take place, the estimates as to the amount vary considerably. The question has probably received far more attention in Germany than in this country; and Herr Prenger, the Engineer of Cologne Gas-Works, has found that the decrease in gas-making value of English coal is from 3 to 15 per cent., or an average of 7 per cent., when stored in the open, and from 0 to 10 per cent., or an average of 4 per cent., when stored under cover. Some authorities state that practically no deterioration occurs, and, no doubt, a great deal depends on the class of coal in question. The recent coal strike, however, afforded an opportunity of gaining some experience on the subject, and, judging by working results, those coals which had been lying in stock for some years undoubtedly yielded less gas, less ammonia, and a rather inferior coke—the latter giving a greater proportion of breeze. The loss in calorific value appears to be quite slight, although the heating value of the coke is reduced in some cases. This usually makes itself felt in the percentage of coke used as fuel.

The results of some experiments carried out on the coal-testing plant at the Saltly Gas-Works of the Birmingham Corporation by Dr. Davidson showed that the gas multiples for coals which had been stocked for perods of six months to two years were in every case lower. No definite loss per annum is fixed by the tests, but it would appear to be no more than 2 per cent. The experiments showed that while the gas value decreased the liquor increased very appreciably; but the coke was markedly inferior. The following figures are those given by a well-known English gas coal which was tested after the intervals as stated:—

	Moisture.	Make per Ton. Cubic Feet.
On arrival	2·71	11,818
After 3 months	5·22	10,708
,, 5 ,,	5·64	9,780
,, 6 ,,	7·58	9,630
,, 7 ,,	5·72	9,817

The tendency for the moisture to decrease and for the gas yield to increase, as shown by the bottom figures, is certainly remarkable, and it is difficult to offer any satisfactory explanation. It certainly has been suggested that deterioration goes on to a certain stage and then ceases; but the writer has never seen it stated that after this period is reached the coals begin to retrieve their

losses. Probably in this case the difference can be put down to some undetected error in the test.

The Storage of Coal.

The ideal state of affairs on a gas-works would, of course, be to take in just as much coal as is required for present requirements so as to avoid any necessity for keeping a stock in hand. Owing, however, to the fluctuating output of gas-works, and the fact that collieries turn out an amount which is fairly constant all the year round, these conditions are, needless to say, impossible. Moreover, in some cases a reduction in price may be obtained for coal delivered during the summer months; and many gas companies are eager to seize upon this opportunity. In respect to coal deliveries, England is more fortunate than many other countries. In Germany, for instance, some works are obliged to take the whole of their coals during the summer season, owing to the waterways being closed by frost throughout the greater part of the winter. In the same country, too, stored coal is liable to deteriorate to a far greater extent, owing to the wider variations of temperature and fluctuations of weather conditions.

At the present day, probably far more coal is stored out in the open than in elaborate stores such as were erected as part of the retort-house on nearly all works twenty years ago. There are still, however, many believers in the indoor method; and there is no doubt that coals deteriorate to a far less extent when sheltered from the weather. The opinion is expressed by some engineers that coals are just as likely to heat up under cover, and when they do they are far more difficult to get at. Under any circumstances, care should be taken to see that the store is not situated too near to the heat of the retort-bench. It is with stores of the closed type that particular care is necessary with regard to the use of water. When coal is stacked in a bin and takes fire, the application of water to the red-hot carbon will in all probability be followed by the formation of water gas. This gas, in addition to being a source of danger to the men owing to its poisonous nature, may mix with a sufficient quantity of air to form an explosive mixture, which is likely to result in the destruction of the bin.

Professor Lewes has pointed out the danger of such conditions occurring in the holds of colliers and the bunkers of ships. Here the question is more serious; for if a fire does occur, some steps —and water is usually the only means available—must be taken to put it out. Coals stored in bunkers which are in proximity to the ships' boilers, and ships meeting with higher air temperatures as they journey through the tropics are frequent sufferers, owing to the external source of heat being sufficient to promote the action of spontaneous ignition. Professor Lewes says that "the action of occluded oxygen in coal is enormously aided by the presence of moisture; so that heavy rain while a coal cargo is being taken on board or stored generally results in heating, and often active danger. The latest suggestion for the prevention of spontaneous ignition of coal is to wet the cargo or the mass in store; and as long as the coal is practically kept wet with water, this no doubt would be effectual. In practice, however, I conceive no more dangerous suggestion, as a shipowner has no desire to limit the carrying capacity of his vessel. Consequently, he would merely moisten the coal to a degree that would accentuate—not lessen the danger." It has been already pointed out that small heaps are less liable to danger than the larger ones; and this is further borne out by statistics with regard to coal cargoes proceeding East. When the cargo amounts to 500 tons, the cases of spontaneous ignition reported are only about 0·25 per cent.; when the quantity is increased to 2000 tons, the proportion rises to 9 per cent.

Professor Lewes has proposed to deal with burning coal by the employment of certain gases which have the power to stop combustion, by keeping the air away from the burning mass. One of these gases is carbon dioxide; and when this is compressed at a certain temperature and pressure, it is reduced to a liquid state, and can be stored in special vessels. These bottles are fitted with a fusible plug and buried in the coal. With a certain rise in temperature the plug melts, and the contents are allowed to escape into the surrounding coal, producing "a large zone of intense cold, and cooling down the surrounding mass to a comparatively low temperature." The action, however, does not stop here, as the cold, heavy gas remains in contact with the coal; diffusion taking place but slowly through the small exit.

The Constuction of Coal-Stores.

When the erection of coal-stores is contemplated, it is most important to ascertain whether the projected ground level is sufficiently high to escape the ground water after a heavy rainfall. The practice is often followed of dividing-up the stores into separate bins by means of vertical walls, and this is certainly of advantage in preventing a fire spreading. Moreover, each of these bins can be made of a definite capacity (so many tons per foot deep), which enables a good idea of the stock to be obtained at a glance.

The floor of the store should preferably be paved with slabs of stone and designed so that the moisture can drain away. In this respect the design of fig. 1 is to be preferred to that shown in fig. 2. Iron columns and ties passing through the bins should be avoided as far as possible, as they are said to favour the spread of fire—in any case, they should be coated with concrete. Plenty of fresh air in the covered store is a most important item, for men suffer from the ill-effects of a poorly ventilated shed. This is supposed to be due to the vapours of acetaldehyde, which are

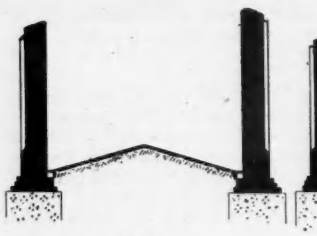


Fig. 1.

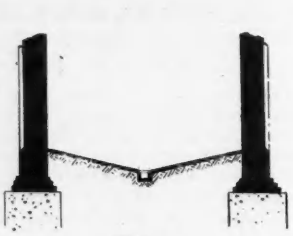


Fig. 2.

known to interfere with respiration. Ventilation is best provided for by a continuous louvre running along the roof of the store.

Pressure on the Walls.

The majority of coal-stores erected are probably based on some standard design which has been found to answer well in practice. If perfect reliance is, however, to be felt, it is essential that the walls should be designed in a scientific manner, and the pressures due to the coal should be properly computed. For this purpose, the well-known Rankine formula for earth pressures may be used, and it is only necessary to see that the resultant pressure cuts the various sections of the wall inside the width of the base. In working out the pressures, the weight of ordinary bituminous coal may be taken as 54 lbs. per cubic foot, and the angle of repose as 45°. Then we have the formula:

$$P = \frac{WH^2}{2}\left(\frac{1 - \mathrm{Sin}\phi}{1 + \mathrm{Sin}\phi}\right),$$

where P is the total pressure per foot run at a depth of H feet, W is the weight of coal per cubic foot, and ϕ is the angle of repose of coal. For example, suppose we require to build a store which will stack coal to a depth of 15 feet. Then

$$P = \frac{54 \times 225}{2}\left(\frac{1 - \mathrm{Sin}\ 45}{1 + \mathrm{Sin}\ 45}\right), \text{ and } \mathrm{Sin}\ 45 = \frac{1}{\sqrt{2}}$$

Working this out we get P = 1042 lbs. at a depth of 15 feet, or an average pressure of 69 lbs. per square foot. This gives the total horizontal pressure at the bottom of the wall, and from the triangle of forces the position of the resultant can be found, and, accordingly, the thickness of the wall at the bottom. If the same treatment is applied to find the pressure at various depths, the decrease in thickness of the wall as it rises is obtained.

In cases where the wall simply serves as a retaining wall so that coal can be surcharged, the formula must be used in the following somewhat complicated form—viz.:

$$P = \frac{WH^2}{2}.\mathrm{Cos}\ \gamma\left(\frac{\mathrm{Cos}\ \gamma - \sqrt{\mathrm{Cos}^2\gamma - \mathrm{Cos}^2\phi}}{\mathrm{Cos}\ \gamma + \sqrt{\mathrm{Cos}^2\gamma - \mathrm{Cos}^2\phi}}\right),$$

where γ is the angle of surcharge.

This, however, reduces itself to a simple and easily workable form when the angle of surcharge is equal to the angle of repose of the coal, and this would nearly always be the case. The formula then becomes:

$$P = \frac{WH^2}{2}\ \mathrm{Cos}\ \phi.$$

Storage under Water.

The storage of coal under water has recently attracted a good deal of notice, and has been carried out on a large scale in America, but chiefly with coals of anthracite type. It is said that practically no oxidation occurs, and the coal can be kept for an indefinite period without visible deterioration. The gases in the pores appear to be prevented from escaping, and the temperature is certainly more constant and can never become very great. It is also claimed that the effects of pressure and the rolling of lumps one over the other are checked by the water forming a cushion, and owing to this less dust is made. Coal which has been submerged for some time has a decidedly dull appearance; but this is merely superficial. It is also distinctly brittle. When the coal is taken out of the water it quickly dries; and experiment has shown that heaps which have been submerged for periods ranging from three to ten years could not be distinguished from ordinary coal after lying in the sun for 36 hours.

The English engineer, however, is somewhat cautious about the carbonization of coal which is likely to contain a heavy amount of moisture; for he knows what is in store for him in the way of increased sulphur impurities. Moreover, naphthalene troubles are said to be increased. The wet storage method might, perhaps, recommend itself to those who carbonize in vertical retorts only. Finally, the writer would point out that a great deal of anxiety can be avoided by taking out a policy against spontaneous combustion. The premium for such a policy is absurdly small, and amounts to about 2s. for every £100.

At the autumn meeting of the Iron and Steel Institute, which opens in Leeds on the 30th inst., and extends to the 4th prox., a paper will be submitted on "A New Type and Method of Construction of Large Gas-Engines," by Mr. A. E. L. Charlton, of Manchester. Among the works to be visited during the meeting are the Crigglestone Collieries and the coking plant of the Otto Coke-Oven Company, Limited, near Wakefield.

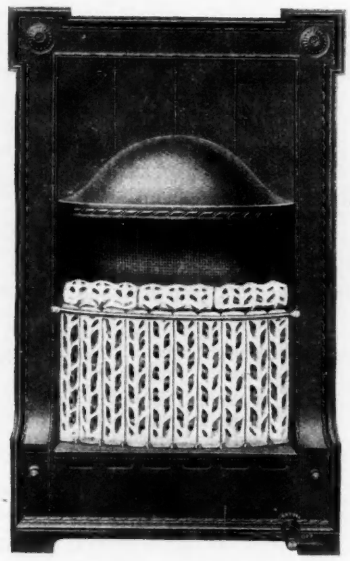
THE 1912-13 GAS-STOVE SEASON.

Messrs. John Wright and Co.'s Novelties.

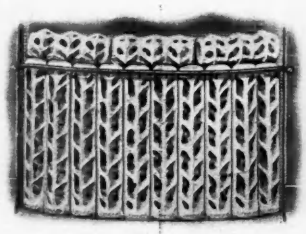
A PRELIMINARY "Press Inspection" of the items forming the bill of fare for the coming winter at Essex Works, Birmingham, offers (as its predecessors have so often done) much food for thought, and much ground for sanguine anticipation. Messrs. Wright are no seekers after the new, as such; the question they seem to ask themselves is, in what fresh direction can they open up new fields of progress for gas, and incidentally (for they are not philanthropists) for gas-stoves. They remind us, with pardonable pride, of the creative work they have done, as instanced in the "Thermo X" series of gas-fires—to mention only one of their many inventions—and also of their pioneer work in introducing testing methods of scientific accuracy into the gas-stove industry. They take the broad-minded view that the gradual movement towards the general adoption of scientific methods, both of construction and of testing, is a thing ever to be welcomed by them, as any raising of the general standard in this way benefits every unit, and particularly those who lead the way. For example, they recall that their gas-fires were the first, and for some time the only fires, so designed and constructed (including an oval flue outlet extending practically the full width of the fire) as to carry off all the products of combustion. This escaping of products is a matter on which they have issued repeated warnings; and they are glad to see that the question is now engaging the attention of others of their colleagues in the industry.

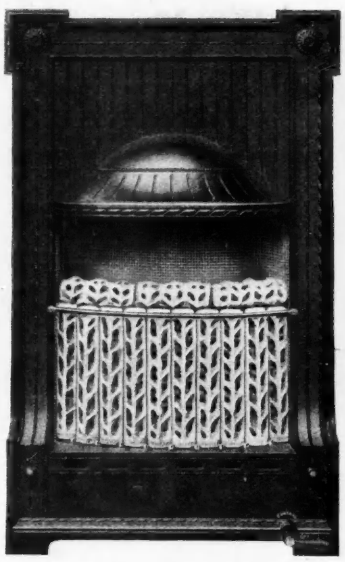
Their method of testing in this connection is of the utmost simplicity and accuracy; nothing is left to chance. The temptation, they tell us, to adopt "picturesque, empirical methods of testing has been steadily resisted and carefully avoided by them; and, on the other hand, the greatest care has been taken in construction to avoid the danger into which less perfect experience would not unnaturally hurry anyone—of effecting the complete removal of the combustion products by means such as would with any normal chimney—*i.e.*, one having no downdraught—remove not the products only, but much valuable heat also." A fire, for instance, that carries off all its products without being attached to a flue will, the firm submits, when the ordinary chimney draught comes into play, "inevitably carry off more than the products—to wit, an unnecessary number of heat units as well; and a lowered room-heating efficiency is the result." Especially is this the case where the radiants extend up into the canopy. Under these conditions the rush of air over them helps to cool the radiants. For this reason on the one hand, and because they consider it both more artistically perfect and of more comfortable appearance on the other, Messrs. Wright have, in their "Thermo" fires, always left a space between the top of the radiants and the lower edge of the canopy. Thus the Englishman's inherent love of a warm, bright fire, not surrounded entirely with a cast-iron frame, is satisfied; while, at the same time, the demands of hygiene and economy are subserved.

The test Messrs. Wright adopt for ensuring the effectiveness of their constructional methods in this particular direction, is one which they have already impressed on the attention of the industry—viz., the fire is fixed and lit in the room built in connection with their laboratories for the purpose of giving the exact conditions of ordinary use. Air-samples are taken in this room during the test—some immediately over the canopy, others in various parts of the room—and analysis gives its unerring verdict, against which there is no appeal. To tests subject to special temperature or other conditions, experience, they say, has taught them to attach little value. To the fact of their steering thus between the Scylla of unwise construction, and the Charybdis of empirical test, Messrs. Wright attribute the perfection and success of their fires both technically and commercially.



The "Times" Gas-Grate.





The "Standard" Gas-Grate.

This season, desiring once more to lead in a fresh direction, and apart from their other additional designs (to which we shall refer in a moment), they are about to introduce what cannot but be regarded as a move of much importance and wide possibilities. They are impressed with the strong conviction that the gas-fire has at last "arrived;" and those who know most about the history of the great general popular movement of the last year or two in the adoption of gas-fires, can best tell how largely contributory to the inception and fostering of this have been the successive inventions and the ceaseless propaganda emanating from the Essex Works. But seeing that the gas-fire has now arrived, argue Messrs. Wright, "Why should it be a *stove?*" "Why should it not be a *grate*, in the sense that a coal-fire is a grate?" In the past, houses were erected with coal-grates built in, because these were the only grates available, and coal the only fuel. Now, thousands of houses are being erected, fitted with regulation coal-grates, notwithstanding that, in an increasing proportion of these houses, the first tenant will signalize his entry by having gas-fires introduced, and fixed in front of the coal-grate, which is thus superseded from the very beginning.

Messrs. Wright point out the needless waste that this involves; and they ask, "If there is to be a gas-fire at last, why not at first?" If this searching catechism be answered Caledonian-fashion, with another question—viz., "Where are the gas-grates?" the question at once produces a display of the "Times" and the "Standard" gas-grates, which Messrs. Wright have designed and prepared for this winter's market, expressly in order to render possible the new movement they forecast. And after this display, one is left with no answer at all. Years ago there were one or two efforts made to create a market for a gas-grate; but that was in the gas-fire's unregenerate days, before the era of the "Wizard" and the "Thermo." Then things were not ripe, say Messrs. Wright. To-day, there seems to be every reason why the movement should be instituted; and we welcome the "Times" and "Standard" as launching the movement in excellent style. It is the first deliberate effort we have seen to inaugurate a new era of gas-grates instead of coal-grates. Such a consummation—happy alike for the gas authority, the gas gratemaker, and the householder—will take time and some persistent propaganda work. But "it is a consummation devoutly to be wished;" and we believe that Messrs. Wright's introduction of the "Times" and "Standard" gas-grates is a far-seeing and important departure.

The stoves themselves, which embody all the "Thermo X" points of advantage, are, in design compact and unobtrusive, and, to the artistic eye, eminently satisfying. These grates may be fixed under all conditions; for there is a loose plate in the back casting which, when removed, gives access to the back of the fire. A coal-grate may, therefore, be replaced by a gas-grate, and the latter securely fixed without disturbing the existing tiles. Although the grate is built-in, a simple patented device worked from the front holds the fire-brick firmly in position, and yet allows it at any time to be easily removed and replaced. The ordinary gas-stove being an afterthought, one tolerates (if with a grumble) the too-obvious gas-pipes and gas-tap. In a permanent gas-grate, things must be otherwise; and the dual tap and gas-pipes are buried in the grate-body. Their only monument is an almost imperceptible little ebony thumb-piece.

The gas-grate innovation referred to is the most notable, but

The "Baskerville" Dog-Grate.

by no means the only feature of the Essex Works programme. To the "Merlin" and "Talisman" stoves, which last year augmented the ample range of "Thermo X" fires, is added this year the "Sorcerer," a flat-topped fire of plain design, uniform with the two named, which will doubtless share the favour already enjoyed by its earlier consorts.

The "Kenilworth" Dog-Grate.

An examination of another range of new gas-grates brought out by Messrs. Wright this year, inclines one to regret that to a certain type of grate should cling the somewhat unpleasing generic title of "Dog"—for no more grace of design or symmetry of shape could be conceived than is found in the group (perhaps we ought

The "Sirius" Dog-Grate.

to say the pack) of "Dog" grates, the "Kenilworth," the "Baskerville," and the "Sirius." The first has already been seen in 17-inch fire width, and was referred to in our columns a twelvemonth ago. It embodies the makers' wide-fire principle, appearing as a series in 14-inch, 17-inch, and 21-inch fire-fronts. The sister grate, the "Baskerville," is for use without a canopy; and the "Sirius" is designed on elegant, plain lines, without any ornament, but with a canopy. It will be observed by the acute reader that all the names have a subtle relation to the title "Dog" fire; and designs so charming must ensure for themselves the favour of all who love to surround themselves with beautiful things, and cannot but bring their quota to the extension of gas-heating.

The most recent of Messrs. Wright's successes, the "Calefactor," takes its place already among the "classics" in the pages of the makers' newest list, and sundry less fresh ventures complete a very attractive programme.

SEASONAL TRADES—THE GAS INDUSTRY.

"Seasonal Trades," by Various Writers, including a Section on the Gas Industry, by Frank Popplewell, B.Sc.*

THIS is a subject which has some considerable bearing on the question of unemployment, and is one which has been specially studied at the London School of Economics and Political Science. The outcome of this special study is disclosed in a book bearing the above title; the section on each trade being the work of a different author, under the direction of Mr. Sidney Webb.

Eight trades are dealt with, more than a fair share being devoted to the gas industry—a subject treated by Mr. Frank Popplewell, B.Sc. Though much painstaking work has been devoted to the compilation of a volume by no means modest in size, the reader will realize that the authors have but touched the fringe of the subject. There appears to be an absence of data making the task no light one; and for this reason the work under review may be described as a praiseworthy effort. It collects in one volume the bulk of the available data dealing with the subject; and, what is more important, it has shown the need for a more exhaustive collection of statistics bearing on this great problem of unemployment.

A paper treating of this aspect of the gas industry was presented to the Royal Statistical Society on May 16, 1911, and was the subject of an editorial notice in the "JOURNAL" for May 23 of last year. The same issue contains extracts from the paper itself. The subject has been revised and enlarged for the purpose of publication in the work under review. The conclusions arrived at by the author are matters of general knowledge to members of the gas profession. The author, in fact, gives a faithful account of the process, the arrangement of labour in summer and winter, the class of labour and earnings, the modern substitution of machinery and its effect on labour, and the various other details in connection with the matter under notice. The following abstract is noteworthy:—

> The work of gas stokers and firemen, who constitute the greater part of the retort-house labour, is unskilled, in that it requires no prolonged period of training. A "green" hand can be trained to stoking in a couple of weeks. In the sense that the work demands the exercise of intelligence and the expenditure of sustained physical effort, it may perhaps best be described as semi-skilled. It is somewhat surprising, therefore, to find that earnings approach or even exceed those of highly skilled workers in other trades. For the whole of the United Kingdom, the full-time weekly earnings of stokers and firemen in 1906 amounted to 37s. and 38s. 6d. respectively. The corresponding figures for the London district, which accounts for over a quarter of the men in the trade, were 41s. 11d. and 42s. 4d.

The statement that a man can be so quickly trained to the work of stoking is hardly correct, although it is certainly true that a retort-house foreman will make shift with a "green" hand in the temporary absence of one of his regular men. But this is only because there is no better man to engage at the time, and because there are usually one or two duties in a retort-house requiring little skill to which the strange hand can be put. As a matter of fact, a stoker in a machine-house is expected to do a share of every kind of work, and it would certainly take a young able-bodied man at least three months to become at all proficient. At the same time, the work is only semi-skilled, and is undoubtedly well paid; but it must be remembered that most stokers are not fit for retort-house work after the age of 50, and must then work at a lower wage. This is not the case with skilled workmen, such as bricklayers and carpenters, who work at their full wage for many years later in life. Numerous tables are included in an appendix, to show the relative consumption of gas in the two months June and December, together with the number of men employed in the same months, with a view to indicating to what extent employment varies in summer and winter. Generally speaking, it was shown that while the make of gas was greater in the winter month by one-and-a-half to two times, the increased number of men employed was not more than about one-fifth. The author, however, formed his conclusions on the data provided by individual gas-works rather than on the average of a number; and for this reason they cannot be said to be altogether reliable. It is a fact that the number of men employed in the winter months does not greatly exceed that employed in the summer months, for the reason that, as the author correctly states, the works repairs absorb a large number of men, who are frequently mainly recruited from the winter retort-house hands. But—and the author

* London: Constable and Co., Limited, 1912; price 7s. 6d. net.

omitted to mention it—another reason to account for this fact is that a considerable number of men are required throughout the summer months to fill the vacancies occasioned by the men absent on holidays. These, again, are usually winter hands retained for this purpose. The tables, without exception, show the tremendous extent of the saving resulting from the substitution of machinery for hand labour. The reduction is from about 3s. 6d. per ton to as low as 9d. per ton in carbonizing wages, and even lower with vertical retorts. In spite of the greatly increased use of machinery, the wear and tear costs per 1000 cubic feet show but little (if any) increase.

It is interesting to notice that the stove-rentals charged by a number of Suburban gas companies have increased from 0·61d. per 1000 cubic feet of gas sold in 1898 to 1·90d. in 1909. This extensive use of gas for fuel purposes (especially in the case of cooking in summer) and the universal use of machinery in large and moderate sized works explain the appended table, which shows that the gas industry is nowadays a much more regular employer of labour than was the case a quarter of a century ago.

Board of Trade Returns.

Number of Persons Employed by Gas Undertakings.	1885.		1906.	
	Number.	Percentages.	Number.	Percentages.
In maximum weeks .	35,737	153·4	71,854	120·4
In minimum weeks .	23,283	100·0	56,691	100·0

And it would show even better in 1912 than it did in 1906.

The author is exaggerating in stating that "water-gas is extremely poisonous, and demands elaborate precautions to be taken against the slightest leakage in the 'producer,' 'carburettor,' and 'purifier,' as well as in the pipes. For this reason, many gas managers refuse to have anything to do with it." This is news to gas engineers. There are certainly no more precautions taken in the manufacture of water gas than in that of coal gas, and any increased danger is rarely (if ever) experienced by those actually engaged in the process of manufacture.

In the Appendix, there are no less than 24 tables illustrating seasonal changes in consumption of gas and number of men employed over a period of years. The tables include many details of the earnings of the various grades of workpeople employed by gas undertakings, the total number employed in each month of the year 1906, figures relating to gas companies' profit-sharing schemes, comparisons of the cost of working by hand stoking, manual and machine stoking, and with inclines at different gas-works, and many other and similar figures dealing with seasonal changes.

In the "Editorial Notes" to which reference has already been made, it was pointed out that, though there had been a very substantial levelling-down of the fluctuation in the labour employed during summer and winter months, yet it was not altogether desirable, from a strictly social point of view, that this state of affairs should continue to develop. It is in the winter months that employment is most needed, and when the pinch of poverty is most keenly felt. For this reason social reformers should rejoice that gas-works employ a preponderance of labour in the winter. Further, it was shown that the consumption of gas in fires in the cold winter months bids fair to counteract the heavy summer consumption resulting from cooking and trade uses. This will again increase the fluctuation—as the editorial pen puts it—to the advantage of labour in the period of its greatest need.

OPTICAL PYROMETRY IN GAS-WORKS.

The "Leskole" Pyrometer.

In view of the increased attention given by gas engineers and managers of late years to the subject of carbonization and the production of higher yields of gas from the bulk of coal dealt with, the necessity for maintaining the temperature of the retorts and regulating the air supply to the furnaces so as to obtain the best results, does not need emphasizing. Gas making is a process involving high temperatures; and though there are in use what may be called rough-and-ready methods of ascertaining them, it is only by pyrometry that absolute exactness can be arrived at. Several pyrometers are now on the market; those based upon thermo-electric principles or the measurement of electric resistance being widely known. There are, however, many cases in which it is not practicable to employ them, because the temperatures to be dealt with are beyond the limits of the thermo-couples (1600° C.), or because instantaneous observations are necessary of moving masses of material in a solid or liquid state. For these purposes, there is now available the optical pyrometer—a practical, convenient, and at the same time accurate measuring instrument, which utilizes the relationship between the intensity of the light-rays emitted by heated bodies and their temperature. By simply pointing the instrument at the object under observation, even an unskilled workman is able to read instantaneously on a clear scale, without calculation, its correct temperature, no matter how high it may be. The value of such an instrument in retort-houses of gas-works will, we think, be acknowledged.

It has frequently been asserted that optical pyrometers are fitted only for use in the laboratory. Stronger kinds have, however, been gradually evolved from the more delicate instruments; and among them may be mentioned the one manufactured by the Leskole Company, Limited, of Enfield, and bearing their name. In outward appearance, it resembles a telescope; and it is used in like manner. When focussed upon the object under observation, its light-rays pass through a fine slit in front, are polarized, collected, and concentrated by various prisms, so that they illuminate one half of a circular field, the other half of which is lighted by a small electric lamp fitted in the front part of the instrument, and having its rays similarly directed. The ocular, through which the observer views these two fields, is provided with a Nicol prism, which can be turned by hand, and enables the user to adjust the two halves of the lighted circle of the pyrometer to exactly equal intensity. As the quality of the light of the electric lamp is under control, and therefore known, a comparison of its intensity with that of the object under observation enables an accurate determination of the temperature of the latter to be made by means of a formula lately established by Professors Paschen and Wien.

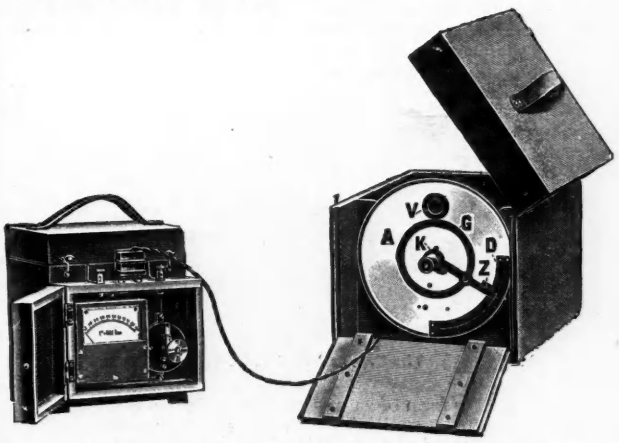


Fig. 1.—Large Type of Leskole Optical Pyrometer, with Battery Case open, so as to display the Ammeter and Regulator.

The pyrometer under notice is made in two patterns—the large standard instrument, shown in fig. 1, which is supplied with one or a number of centigrade scales, ranging from 900° up to 7000° C., and the small one, fitted with scales ranging from 700° up to 1300° C. Both types are supplied in oak carrying cases, and can be used in the hand, on a stand (as shown in fig. 2), or on a wall bracket. In fig. 1, K is the ocular, provided with a pointer *Z*, which directly indicates the temperature of the object on a clear scale D fixed to a large disc A; V being a special red light through which the hot object is focussed.

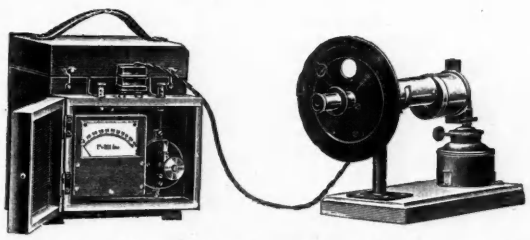


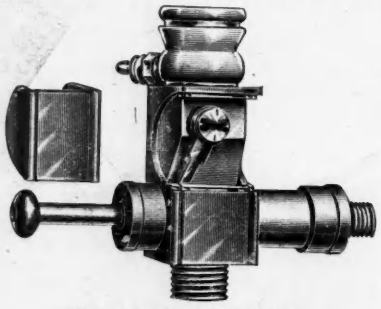
Fig. 2.—Small Type of Pyrometer, shown without Case but with the Calibrating Lamp in Position.

The accuracy of the readings depends upon the light of the electric lamp remaining constant. As this is subject to variation both on account of wear and the condition of the 4-volt battery supplying the current, the instrument is calibrated from time to time with the aid of a special test lamp of known candle power, which is supplied with each set. The battery is fitted in an oak carrying case (as shown in fig. 1), and to this is attached a precision milliammeter and a regulating rheostat. By noting the indication of the ammeter when the test light is at equal intensity with the electric lamp in the pyrometer, test conditions may be maintained by adjusting the regulating rheostat as required to obtain a constant supply of current to the lamp.

The following are some of the special advantages claimed for the "Leskole" pyrometer: The whole instrument is enclosed by a light but rigid steel casing, which protects all parts, including the electric lamp and all its connections, against dust, excessive heat, and damage through rough usage. The direct-reading temperature scale is fixed to a large disc which completely guards the free eye of the observer against dazzling or blinding, so detrimental to the accuracy of the readings. To replace the lamp when worn out, it is not necessary to detach the scale or take any part to pieces, but merely to unscrew the dust cap in front. A battery of only 4 volts is used, and forms with the ammeter and regulator one compact case, which is easily carried.

PNEUMATIC GAS LIGHTING.

It must be apparent to the most casual observer that both the gas industry and users of gas owe a good deal to those who have spent much time and thought on the devising of practical means for lighting-up gas-burners at a distance. The marketing of appliances having this for their object has not only placed an additional convenience in the hands of those householders and others whose burners are fixed in positions which are easily accessible, but it has at the same time proved of great service in connection with the installation of gas in places where the lights are located at considerable heights. Among these distance lighters—we have not just now in mind the automatic systems of lighting and extinguishing street-lamps—the arrangement of the Pneumatic Gas Lighting Company, of No. 36, Farringdon Street, E.C., is well known, and has stood the test of time. It has in the past proved satisfactory in working, as the continually growing number of installations bear witness; but this, of course, is not to say that improvement was impossible. On the contrary, an improvement has been brought about, and is the subject of a patent taken out by Mr. Neville Edwards, the Managing-Director of the Company.



The P.1912 New Patent Valve.

In the earlier form of valve the pneumatically-operated piston was in direct communication with the gas-way; and experience showed that the fouling of this piston might result in sticking. The present invention therefore has for its object the mounting of the piston in a chamber that has no communication with the gas-ways—the valve controlling the supply of gas being connected by means of a lever with the piston. An abstract of the patent, with drawings of the arrangement, appeared in the "Journal" for Jan. 9 last (p. 92); and the illustration which is now given shows the valve in its complete form. The sliding of the piston—either by pneumatic action from one end, or by the movement by hand of the rod provided at the other end—by engaging the lever, turns the gas-plug to the "on" or "off" position, as the case may be; and the patentee points out that, as in this way very considerable leverage is afforded, the tendency to hold the gas-plug against rotation by any fouling due to the gas is small compared with the effect of fouling upon a sliding member such as the piston. It is also claimed that the valve is one well adapted for use with high-pressure gas, as the friction tending to hold the plug when subject to pressure is easily overcome by the leverage of the arm.

It is a neat and well finished little valve, and is adaptable either to upright or inverted burners. This latter point is, of course, one that is deserving of consideration, inasmuch as it renders smaller stocks possible. Then, again, it is very easily assembled, and it possesses a strikingly level action. A set of the valves which have been in use for some two months past in the Company's offices can be seen working with perfect smoothness. Particulars of this new valve, together with illustrations and details of the Company's numerous other additions to stock and improvements are to be found in their catalogue for the forthcoming lighting season.

THE NEW GAS-WORKS AT HELSINGFORS.

The gas supply of Helsingfors was in the hands of a private Company from 1860 to 1900. In the latter year, the Corporation exercised its right to purchase the undertaking, for which it paid about £55,000. The old gas-works were, however, at that date becoming inadequate; and though some new settings were erected at the beginning of the new century on such little space as remained available at the works, and water-gas plant was erected in another part of the town, it was evident the construction of new works would have to be put in hand at an early date. A site for them was chosen in 1907; and they were completed in the year 1910. The following particulars are taken from a description of the new works by Baron Ed. Cedercreutz, of Helsingfors, in a recent number of the "Journal für Gasbeleuchtung."

The site chosen was outside the town, in the quay district of Sörnäs, which is a suburb separated from the town by a creek, which is crossed only by an old wooden bridge. The laying of a main beneath the creek and in the main street thence to the centre of the town presented difficulties; and it was considered preferable to carry a high-pressure main three miles round the creek to the town, and to erect in the town a detached distributing gasholder. This gasholder, being imperatively necessary at once on account of the inadequate holder provision at the old works, was put in hand first and connected for the time being with the old distributing system.

The scheme for the new works, prepared by the author, was submitted to Herr Weiss, the Manager of the Zürich Gas-Works, for approval, before being adopted by the Corporation Gas Committee in the autumn of 1908. A sum of £157,617 was voted for expenditure on the new works, but actually they have cost to date only about £128,000,—savings having been effected chiefly through simplification of the arrangements for the unloading and storage of coal. The new works came into use on Aug. 24, 1910, and six days later the old works were put out of action.

The new works are situated on the foreshore, and coal-carrying steamers come directly alongside, and are unloaded into tip waggons, which are drawn by electric power up an incline to a stage, which is about 13 feet above the ground level. This stage runs along one of the longer sides of the storage yard, and from it a cross-viaduct traverses the yard. The coal is discharged from this viaduct, which is shifted to another position as soon as the coal in one spot reaches its level. The arrangements admit of 600 tons being discharged in ten hours, the cost of unloading into store averaging, inclusive of current, under about 5d. a ton. The original project provided for storing coal under cover, but this plan was given up for the sake of economy, and during the past winter no appreciable disadvantage has been felt from storage in the open. The coal is taken from the store yard to the coal-breakers in tip waggons, and thence by a Pohlig conveyor to the coal-bunkers in the retort-house.

The retort-house is constructed entirely in iron and concrete, and is wide enough for two rows of vertical retort-settings. As a first instalment, eight settings of ten 4-metre (13 feet) Dessau vertical retorts have been erected. The coke is carried by a De Brouwer trough conveyor from the retort-house to a steel band conveyor, which transports it to the sorting plant. It falls from the screens into reinforced concrete receivers, from which it is drawn off direct into carts or railway waggons, or distributed in the coke yard by plant similar to that which is used for putting coal into store.

The condensing plant is a combination of atmospheric and water-cooled condensers, and the tar-extractors are followed by naphthalene, cyanogen, and ordinary washers. The purifiers, which are in a separate building, have Bamag grids. The revivifying floor is above the purifier floor, and has mechanical equipment for handling the purifying material. The condensing and purifying plant was obtained from Berlin, except that all the larger sheet metal parts, as well as the atmospheric condenser and the purifier lids, were made locally.

The gasholder, which is of 700,000 cubic feet capacity, is enclosed in a building on account of the temperatures experienced in Helsingfors. The building is 92 feet high to the cornice of the roof. The holder guides are on sixteen masonry columns in the wall of the building, which columns are stiffened by four reinforced concrete rings at different heights. This method of construction admitted of the wall proper being only 1½ bricks in thickness, and gave a comparatively cheap gasholder house.

The station gas meter and governor are in a separate house. The boiler-house, with the electric power and pumping plant and water-tower, is situated between the ground covered by the present works and the area reserved for extensions. There are at present three boilers, each with 860 square feet of heating surface; and in the house space has been provided for three more boilers. The electric plant consists chiefly of a transforming station at which high-tension three-phase current taken from the electricity works is reduced to a working potential of 220 volts. A steam-turbine and a dynamo, capable of supplying all the current required on the works, have, however, been provided for use in case of need, and the steam-turbine is used for driving the compressors which force the gas through the high-pressure main to the distributing gasholder in the town.

The gas liquor is worked up to liquor ammoniæ and sulphate. In the same building with the liquor plant is the water-gas plant, which was transferred from its former site. The relief gasholder of this plant, 35,000 cubic feet in capacity, was removed by sea bodily to its new position. It is enclosed in a masonry building. Stores, workshops, and offices are in other buildings on the works. A workmen's canteen, lobby, and bath-rooms are provided adjoining the retort-house. There is a well-equipped chemical laboratory in the office building.

The new works were in operation throughout 1911; and the make of gas for the year was 197,549,700 cubic feet, in the production of which 17,700 metric tons of coal were used. The make of gas, without steaming, averaged 11,285 cubic feet per English ton. The manufacturing charges, which for the year 1909 in the old works amounted to 1s. 2d. per 1000 cubic feet, fell to 7·3d. per 1000 cubic feet last year at the new works. The proceeds of the sale of bye-products covered 99·34 per cent. of the cost of coal.

A Blue-book has just been issued containing the thirty-seventh annual report (1911-12) of the Public Works Loan Board. During the year, the Commissioners made 1685 advances for sums amounting together to £3,954,899, compared with 1475 advances for £3,860,301 in 1910-11. Of the former sum, £3,316,603 was advanced on the security of local rates, and £638,296 on that of property. The average rate of interest was £3 11s. 2d. per cent., against £3 10s. 9d. per cent. in 1910-11.

VARIOUS MODERN SYSTEMS OF RETORT-SETTINGS COMPARED.

At the last meeting of the Association of Gas and Water Engineers of Lower Saxony, an animated discussion took place on modern systems of retort-settings, in the course of which some interesting facts and figures were quoted. The report of the discussion was published in a recent number of the "Journal für Gasbeleuchtung," from which the following particulars are taken.

The CHAIRMAN, Herr Hase, the Manager of the Lübeck Gas-Works, after referring to previous discussions on the same subject, called upon Herr Pippig, the Manager of the Kiel Gas-Works, to speak. Herr Pippig, in responding to the invitation, referred to the importance to gas undertakings of an exhaustive investigation of the various modern systems of carbonizing plant, and to the value attaching to pronouncements by works' managers of their experiences with one or other of them. He had himself inspected recently examples of most of the later systems, and collected results obtained with them, because Kiel was about to erect a new gas-works, and a decision had to be made as to the settings which should be adopted. Unfortunately, the mass of data which he had collected had not yet been sifted and considered, so that he had been unable up to the present to make any recommendation. It was necessary, however, to bear in mind the size of the works for which the settings were required in considering their respective merits. Large units did not adapt themselves to the fluctuations of output of a small works so well as small units. Large settings might show a very low fuel consumption when worked continuously in a large works, but in a smaller works, keeping a large setting in reserve to meet small increases in output would entail an expenditure of fuel which would nullify any advantages otherwise presented by this type of setting. The size of the settings must conform with the scale of working if the consumption of fuel was to be kept within proper limits. Moreover, the advertised fuel consumptions commonly referred to results obtained with settings worked continuously at their full capacity. In the speaker's opinion, the best test of the actual fuel consumption of all the settings on a works was to take the figures for the coke available for sale. It would sometimes be found that a works which boasted of its low fuel consumption actually had less coke per ton of coal available for sale than another works believed to have a higher fuel consumption.

Herr SCHWERS, the Manager of the Osnabrück Gas-Works, gave some information he had promised at the preceding year's meeting in regard to the working of his bench of vertical retorts, by showing figures for a full year's work [Table I.]. The figures showed, he said, that as the vertical retorts displaced horizontals there had been a concurrent improvement in the working results in all respects. Unfortunately, the figures for ammonia were not obtainable for the year 1908, as the liquor was not then worked-up on the gas-works. The gas made in the vertical retorts had a mean gross calorific power of 560 B.Th.U. per cubic foot at 60° Fahr., 30 inches of the barometer, and saturated. It was practically uniform in quality, because equal numbers of the retorts were charged every three hours. Twelve hours were normally allowed for working-off the charge; but the time was reduced to eleven hours, or extended to sixteen (always with steaming towards the close of the period), when a greater or smaller output of gas was required per twenty-four hours. The bench of vertical retort-settings, making actually 187 million cubic feet of gas per annum, required two shifts each of two men per diem for the whole work of the retort-house. In order, however, that careful control might be kept over the working, a retort-house foreman was also employed, though doubtless some gas engineers would regard him as superfluous. At the time of speaking, the bench had been in use for about twenty-two months; the days on which carbonization had been carried on averaging 553 per setting. One setting had been in continuous use for 564 days, but had then been let-down in order that it might be inspected. It was in such good condition that it should certainly last as long again before requiring renewal.

TABLE I.—*Osnabrück Gas-Works. Results with Different Settings*, 1908-10.

Kind of Setting.	Make per Ton in Cubic Feet at 60° Fahr. and 30 In. Bar., Saturated.	Coke Consumed.		Coke Available for Sale per Cent. of Coal Carbonized.	Real Ammonia per Cent. by Weight of Coal Carbonized.
		Per Cent. of Coal Carbonized.	Lbs. per 1000 Cubic Feet of Gas Made.		
1908.—Horizontal retorts only	11,084	15·93	31·92	47·26	..
1909.—Half horizontal retorts	11,385	15·00	28·49	54·15	0·231
,, vertical ,,	12,315				
1910.—Vertical retorts only .	12,892	14·93	26·03	57·96	0·263

The speaker showed by aid of a diagram and table the annual production of gas, capital expenditure, price of gas, gross profit and the profit per ton of coal carbonized for a series of years for the Osnabrück gas undertaking. The highest profit per ton of coal since the undertaking was started in 1858 was realized last year with vertical retort working; the price charged for gas being the same as for the previous thirteen years. The vertical retorts at Osnabrück were the old type of Dessau settings of ten retorts, and doubtless better results would be obtained with the newer type.

Herr GOEBEL, of Hamburg, said that in the Hamburg Gas-Works almost all types of settings were in use. In his opinion, large chamber settings were not suitable for small gas-works having a production of (say) from 175 to 350 million cubic feet per annum.

Herr J. BRANDT, of Bremen, thought that settings of large carbonizing chambers, having larger spaces and greater solid masses of material, would require greater care in working, and involve more expenditure on repairs, than settings of vertical retorts. Later, when works which had both types of settings had obtained comparative data for them in regard to the cost of repairs, &c., over a number of years, he hoped that such data would be published.

Herr A. VON FEILITZSCH (the Manager of the Gas and Water Works at Brunswick) said that published particulars showed that there was very little to choose between the various modern settings, when worked without steaming, in respect of yield and calorific power of the gas made, yields of ammonia, tar, and coke available for sale, and maintenance charges. The high charges for interest and depreciation on capital expenditure on modern settings had to be offset mainly by savings in carbonizing wages. But the reports of different works having vertical retorts showed that the yield of gas (without steaming) fluctuated between 57,000 and 141,000 cubic feet per stoker per shift. Vertical retorts 13 feet long were no better than 11 ft. 6 in. horizontal retorts with charging and discharging machinery.

Mr. ANDERSON (Manager of the Hanover works of the Imperial Continental Gas Association) remarked that his experience in regard to the comparative fuel consumption of vertical and horizontal retort-settings was the reverse of that of Herr Schwers. At Hanover, with verticals the coke sold amounted to only 56 per cent. of the weight of coal carbonized, whereas with horizontals it was 58 per cent. Whoever had seen the installation of horizontal retorts at Stuttgart would admit that the last word had not yet been spoken in regard to this system. In most cases, when an installation of vertical retorts was put in, it was well to retain the old horizontal retort-settings for meeting the fluctuations in output. The number of stokers required for vertical retorts was generally the same whether the whole or one-half or one-third of the installation was in use. With horizontal retorts, on the other hand, the number of men required, even when stoking machinery was used, was proportional to the number of retorts in action. In Hanover, the working of the horizontal retorts was as economical as that of the vertical retorts; but the installation of the latter was too small to afford the maximum economy of labour. The same number of men could attend to twice as many settings; and as soon as the installation had been extended, a great saving in wages would be realized. But vertical retorts presented other advantages than saving in wages—viz., diminution of smoke in charging and discharging (a valuable feature when, as in Hanover, the gas-works were surrounded by dwelling-houses), increased yields of gas and ammonia, and less naphthalene and cyanogen. These advantages had determined the choice in favour of vertical retorts for the new gas-works now under construction at Linden, near Hanover.

Herr SCHRÖDER, of Essen, gave particulars of a six days' trial, completed on September 18 last, made with a bench of eighteen large chambers at the Corporation gas-works at Vienna. These chambers formed part of an installation which the firm of H. Koppers were erecting at that works for a total make of nearly 16 million cubic feet per diem. The time occupied in working-off the charge of coal averaged 23 hours 40 minutes. The coal carbonized was screened coal from the Ostrau-Karwin district, containing 1·36 per cent. of moisture, 9·96 per cent. of ash, and 88·68 per cent. of coal substance. The weight of the charge, as ascertained by an automatic machine, averaged 10 tons 16 cwt. 70 lbs. per chamber. The average results obtained in the six days' trial were: Production per diem from the eighteen chambers, 2,260,220 cubic feet, at 60° Fahr. and 30 inches barometer, but under a gasholder pressure of 78-10ths. The make of gas per ton of coal was 11,837 cubic feet, having a gross calorific power of 612 B.Th.U. per cubic foot, and a specific gravity of ·431. The composition of the gas, in volumes per cent., was: Carbonic acid, 2·60; heavy hydrocarbons, 2·93; oxygen, 0·37; carbonic oxide, 9·17; hydrogen, 53·27; methane, 28·20; nitrogen, 3·48. The consumption of fuel—*i.e.*, coke breeze under 1 inch in size and containing 11·4 per cent. of ash—averaged 21·84 lbs. per 1000 cubic feet of gas made. These results, according to the speaker, were in advance of anything hitherto obtained with any other type of setting. Gas engineers interested would be afforded every facility for verifying for themselves the results obtained at the Vienna works.

Herr SCHWERS, of Osnabrück, explained, in answer to a question, that the results given by him [*vide* Table I.] for the vertical retorts referred to regular working, and not to special trial runs. The coke obtained contained on the average 9·3 per cent. of ash (on the air-dried coke), which corresponded with about 6·5 per cent. of ash in the coal carbonized. In trial runs with selected coal, a make per ton of 13,455 cubic feet of gas, having a gross calorific power of 555 B.Th.U. per cubic foot, had been realized.

The discussion then closed.

HIGH-PRESSURE GAS DISTRIBUTION IN RHODE ISLAND, U.S.A.

The number of "Progressive Age" for the 15th ult. contained the following article by Mr. Charles W. Hunter, a gas engineer in the service of the Stone and Webster Engineering Corporation of Boston (Mass.), giving an account of a system of high-pressure gas distribution in Rhode Island.

A problem which is occurring with increasing frequency in the gas business recently confronted the Blackstone Valley Gas and Electric Company, who furnish gas and electricity to the cities of Pawtucket and Woonsocket, in Rhode Island—the population served being about 85,000 in the former and 45,000 in the latter place. Prior to the present year, both cities had their own gas plants, which were operated independently of each other. About this time, however, the Woonsocket plant reached the limit of its capacity; and it became necessary either to build entirely new and larger works or lay a main from Pawtucket, fourteen miles distant, and pump the gas under high-pressure. The firm with which the author is connected were retained to investigate the situation and make a recommendation as to the best plan to adopt. Financially, the high-pressure scheme appeared to better advantage than the extension one. Pawtucket is situated on a tidal river, while Woonsocket is an inland town. Not only would there be a gain in the operating efficiency of the manufacturing apparatus by making all the gas in one plant, but there would also be economy in the transit of raw materials over water as compared with rails. Besides this, the road between the two places, winding alongside the Blackstone River, passes through a number of mill villages containing from 1000 to 5000 inhabitants; and it would be possible not only to supply these consumers direct from the line, but also to make it the base of a system reaching to other towns in Rhode Island and Massachusetts.

From an engineering point of view, however, many "ifs" appeared in the problem. One of the outlying towns supplied from Woonsocket is Blackstone, which, being located in the State of Massachusetts, is subject to its laws and regulations, including those in regard to the illuminating power of the gas. The Pawtucket Company were manufacturing 18 to 20 candle power water gas from Texas oil; and the question arose as to whether it would be possible to pump this gas a distance of fourteen miles under 25 lbs. pressure, reduce it to the ordinary street pressure, carry it another four miles through a low-pressure system, and deliver gas of 16-candle power under actual photometric test in all kinds of weather. Another point to be taken into consideration was the assurance of an absolutely reliable supply. A cold New England winter sends the frost far into the ground, subjecting the gas-mains to a temperature much below freezing, and setting up heavy contraction stresses with resulting strains on the joints. The questions of the probable loss in heating value and the advisability of making the gas supply of a city of 45,000 inhabitants dependent on one main were also considered. But, after careful investigation, it was decided to instal a high-pressure system, and to enrich the gas with benzol at Woonsocket during cold weather if necessary. The capacity of the Pawtucket plant was increased by the addition of one 3 ft. 6 in. water-gas set, with auxiliary apparatus, and a 500,000 cubic feet holder was erected at Woonsocket.

A duplicate pumping plant was put in at Pawtucket, consisting of one 12 in. by 18 in. by 14 in. compound duplex Ingersoll-Rand compressor for regular operation, and a less expensive straight-line machine of the same capacity as a stand-by. Both are controlled by speed and pressure regulators, which automatically hold the pressure on the pumping-main to within 1 lb. variation from the standard. Relief-valves were installed to prevent any possibility of the pressure rising above a safe point even if the compressor should race; and in the works office electrically operated alarm bells were set up, which ring when the pressure falls below 10 lbs. or rises above 40 lbs.

The main itself is of 6-inch pipe, with extra heavy recessed couplings. No compression-tanks were used, though two baffle-tanks, 4 feet in diameter and 10 feet long, were installed—one just outside and the other about a mile from the works—to separate the aqueous and hydrocarbon vapours in the gas at these points. Valves placed at convenient points about half-a-mile apart make possible the isolation of any section of the line in case of necessity; and a Westinghouse air-brake compressor is installed at Woonsocket, in order that high pressure can be kept up on both sides of any section that is being repaired. Expansion sleeves were placed about every 500 feet, to deal with temperature stresses. Particular care was taken to give the main at least a 3-feet cover of earth; and at all bridge crossings it was heavily insulated. To these precautions is largely ascribed the small loss in illuminating power in operation.

The main was laid with great care; every section being tested to 100 lbs. air pressure by means of a portable gas-engine driven compressor, with the result that the unaccounted-for gas amounts to something less than 0·5 per cent. All the consumers along the line are served directly from the main through house governors. At Mannville, a low-pressure gas-distribution system is installed, which is supplied through a Reynolds district governor set up in an underground street vault.

At Woonsocket, the gas passes through a district governor, reducing it from line pressure to 10½ inches, thence through an 11 feet meter to the storage holder, from which it is sent into the distribution system through a balanced and then an automatic low-pressure governor. All the governors used in the system are located in a house adjacent to the plant. This house is fitted with a gauge-board, with recording and indicating gauges showing the pressures at each step of the reduction. Electric alarm bells are installed, which ring when the pressure falls below 5 lbs.; and a water relief-seal is located in the system directly after the high-pressure governor, so that if the governor gets out of order it would not be possible for the pressure of the gas on the meter to rise above 18 inches.

The yard connections are so arranged that the gas may be passed through the meter into the holder and then into the town, or the holder may be bye-passed, and the gas sent directly on to the street from the meter. A benzol enriching apparatus is attached to the main on the outlet of the meter. If the gas is received from Pawtucket with its illuminating power too low to be sent directly to the town, it is enriched with benzol, and put into the holder to mix with the gas already there. But if it is received at a proper illuminating power, it is sent out directly, without being stored and thereby subjected to the possibility of further loss.

The system was put into operation on the 2nd of January last; when a small quantity of gas was pumped to Woonsocket, enriched and stored in the holder. This was increased each day until in about a week the entire daily supply of about 300,000 cubic feet was being received and sent out to the town, and the manufacturing plant was shut down.

Remarkably little trouble has been encountered in operation. As the system was designed to be large enough to provide the next twenty years' output, the daily supply can be pumped over in about six or eight hours; the time for this being chosen so that it will cover the hours of peak consumption. By this arrangement, the amount of gas used along the line during the remainder of the 24 hours is provided by the storage in the line itself, with perhaps, on some days, a five-minute run to boost-up the pressure. The pressure at Pawtucket is kept at 26 lbs. while pumping, and the gas is received at Woonsocket at about 5 lbs.; the quantity passed per hour with this loss being about 34,500 cubic feet.

Considerable experimenting has been carried out at Pawtucket to determine the best method of making a gas out of Texas oil that will stand under compression. The plant is so arranged that the gas made during the first five hours of the day is pumped into the holder reserved for the Woonsocket supply; but for the rest of the 24 hours, the gas is made for Pawtucket consumption, and stored in another holder. The relation between the temperature of the superheater, the coal and oil efficiencies, and the loss in candle power in compression and transmission has been studied, with the result that, for the conditions existing in this situation, it has been decided that a temperature of about 1425° Fahr. is the most economical for making gas for the high-pressure system, and 1350° Fahr. for the low-pressure distribution. The temperatures are recorded by a Bristol pyrometer with its fire end 4 feet from the bottom of the superheater. As the comparative readings have been sufficient for the purpose in view, no attempt has been made to determine whether or not this particular instrument is absolutely accurate.

Hourly photometric readings are made on the gas entering and leaving the compressor at Pawtucket and at the outlet of the high-pressure governor at Woonsocket. The monthly averages from February to March are as follows:

	Inlet to Compressor.	Outlet to Compressor.	Outlet to H.P. Governor.	Loss.
February	20·52	18·94	16·14	4·38
March	19·93	18 61	16·16	3·77
April	18·81	18·17	16·57	2 24

The loss in heating value, as anticipated, is small—averaging about 5 per cent. Two readings of this are made daily; but, on account of the peculiar conditions under which the system is operating—that is, the necessity for maintaining the candle power of the gas required by the Massachusetts law—this is financially more important, and much more closely watched, than the calorific power.

During cold weather, it was found necessary either to make gas of higher illuminating power at Pawtucket or else enrich at Woonsocket in order to maintain the standard of 18 candles which has always been supplied to the latter city. Enriching with benzol was found to be much the cheaper method. The oil is vaporized by steam, and injected into the gas after it leaves the station-meter; the amount being regulated by a needle valve to bring up to a constant value the variable candle power of the incoming gas. The gas is then passed into a 500,000 cubic feet holder, from which it is distributed to the city under low pressure. At first, 90 per cent. benzol was used. But this was changed to 80 per cent.; and probably a still lower grade will be employed finally. The enriching value per gallon of benzol averaged 25,080-candle feet during February, March, and April.

It was expected that compression would condense-out the hydrocarbon vapours having low vapour tension, preparing the gas for the reception of the enriching oil, and that a stable product would result. In order to prove that the benzol would not be deposited before it reached the burner, a testing-station was established about a mile from the works, and candle-power readings were made once or twice a day during the cold weather. On

Feb. 10 and 11, when the thermometer was about zero, some of the gas which had been in the holder about 36 hours dropped from 20 to 16 candles. The loss was ascribed to the fact that this volume of gas had become chilled to the temperature of the atmosphere by reason of its remaining so long in the holder, and that its temperature was lower than that to which it had been subjected in the high-pressure main. Consequently, as its temperature was reduced below the dew-point established in transmission, a deposition of hydrocarbon vapours was inevitable. This, however, has been the only case reported of serious loss between the inlet to the holder and the testing-station.

While the Blackstone system has been running long enough to demonstrate its success from an operating standpoint, it will be the end of the year before the actual financial results can be compared with the original estimate. It is expected, however, that the economies in manufacture and the profits of the new business gained along the line of main will amount to 40 per cent. of the cost of gas in the holder in 1911 at Woonsocket, or at least 15 per cent. on the investment, besides the potential value of the system as a base for future extensions.

ANOTHER AID IN ILLUMINATION CALCULATIONS.

By R. F. Pierce.

[From "Good Lighting"—the Organ of the American Illuminating Engineering Society.]

The usual procedure for "Point-by-Point" calculations is exceedingly tedious, and entails an amount of time and labour entirely disproportionate to the benefits derived. The writer has used the device described below for economizing the labour of such calculations, and believes that it may be made to serve many useful purposes for the practical engineer.

The only essential feature is that all distribution curves be furnished upon sheets of substantially the same size, with the same division spacings.

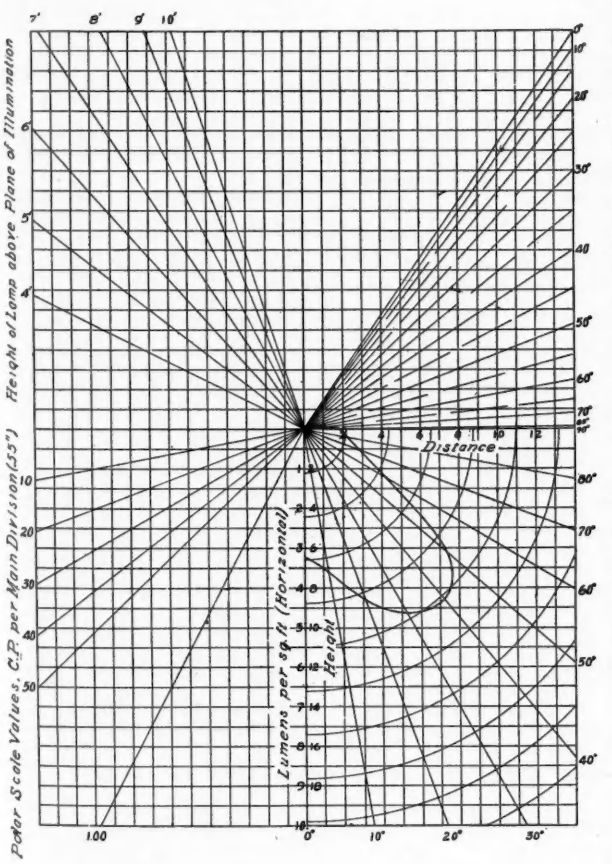

Height of Lamp above Plane of Illumination
Polar Scale Values; C.P. per Main Division (5°)
Distance
Lumens per sq. ft. (Horizontal)
Height

Fig. 1.

A sheet of transparent celluloid is ruled, as in fig. 1, but without the distribution curve, which is shown for convenience only, as it appears through the celluloid. The lower right-hand quadrant of the sheet is placed over the distribution curve with the points of origin superimposed. For the sake of clearness, few lines, giving rather rough divisions, have been used. Any desired degree of accuracy may be obtained (within practical limits) by increasing the number of reference lines.

Locating the angle, from the intersection of the horizontal and vertical lines representing heights and distances (respectively) run along the radial line representing the angle to the distribution curve. Thence proceed in a counter clockwise direction along the circular line representing candle power to the horizontal line through the origin. From this point run upward in the upper right-hand quadrant to the diagonal designated by the angle found below; thence to the left to the diagonal in the upper left-hand quadrant designated by the height; thence downward to the diagonal in the lower left-hand quadrant designated by the polar scale values used in the distribution curve; thence to the right—reading the lumens per square foot on the vertical scale.

This procedure obviates the necessity of locating the angle from a separate table, and likewise the illumination constant, and will permit of sufficient accuracy for all practical purposes.

The chart, as shown, is constructed for obtaining the horizontal component only, though the diagonals in the upper right-hand quadrant may be constructed to give either vertical component or normal illumination.

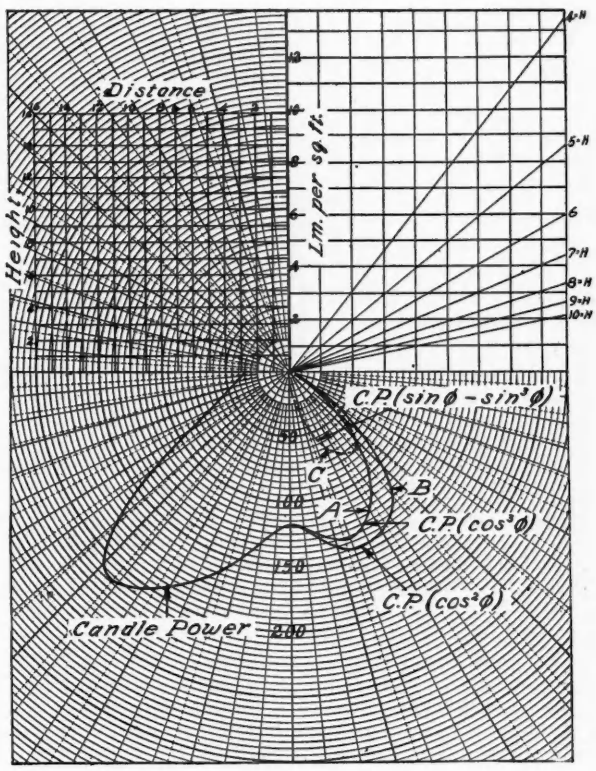


Fig. 2.

In case the latter are apt to be required frequently, the curves shown in the lower half of fig. 2 may be constructed, and the transparent celluloid ruled as shown in the upper half. The points in the curves shown in the lower right-hand quadrant are obtained by multiplying the candle-powers from the distribution curve by $\cos^3\phi$, $\cos^2\phi$, and $\sin\phi - \sin^3\phi$, respectively, for horizontal, normal, and vertical illumination. The chart for locating angles may be in either the upper left-hand or the lower right-hand quadrants. The procedure is similar to that described above, the radial line designating the angle being first located, then the corresponding point on the proper curve in the lower right-hand quadrant. The slopes of the diagonals in the upper right-hand quadrant are proportional to the reciprocals of the heights squared; and the lumens per square foot are found on the vertical scale above the origin.

For certain purposes, where various components from the same curves are frequently required, such a chart will amply repay the amount of time spent in its construction.

The New Gas Plant at Astoria.—We learn that the second unit of the plant of the Consolidated Gas Company of New York at Astoria has been lately completed. This station is one of the most up-to-date in the United States. The first unit produces 20 million cubic feet of gas daily, and the half of the second unit just erected has a capacity of 20 millions. When the plant is finished, it will have nine units, equal to delivering 250 million cubic feet of gas per day—more than twice the present consumption in Manhattan and the Bronx. Each unit is estimated to cost about $10,000,000. The new plant uses coke which is made by the first unit, and will supply water gas from a generator-house having an area 85 ft. by 211 ft. and 100 ft. high. In connection with the new works, a tunnel [particulars of which have been given in the "Journal"], 21 ft. 6 in. diameter, to contain two 70-inch pipes, is being driven under the East River. A large holder, 300 feet in diameter and 480 feet high, will also be erected; the foundation for it being already completed.

ILLUMINATING GAS IN LIQUID FORM.

In the course of an article under the above heading in a recent number of "Progressive Age," Mr. Walter O. Snelling, of Pittsburg (Pa.), gave the following particulars of work which has been going on for the past two years with the object of obtaining from natural gas pure and homogeneous liquid products suitable for the cheap and convenient lighting of isolated dwellings.*

Efforts have been made for many years to utilize compressed natural gas as a means of lighting; and cases are known where cylinders of the gas have been so used in the near vicinity of natural gas fields, but outside of the range of popular distribution. The pressures which result from the compression of natural gas are, however, very considerable. The average steel cylinder used in the distribution of compressed oxygen, for example, has an actual capacity usually ranging from ¾ to 1 cubic foot. Upon compressing up to 100 volumes of natural gas in such a cylinder, the pressure reaches 100 atmospheres, or 1500 lbs. per square inch; and it is, of course, quite impossible for cylinders holding as little as 100 cubic feet of natural gas to be utilized commercially. These two experiments in the compression of natural gas were the forerunners of a series made towards liquefying the higher members of the paraffin series present in oil-well gases, and as a result of these studies Mr. Frank P. Peterson and the author devised a method whereby there is now being prepared commercially a liquefied natural gas, known under the trade name of "Gasol," which seems destined to take an important part in the solution of the problem of the lighting of isolated dwellings.

Realizing that the simple compression of natural gas would not yield a product which could be commercially handled on account of the high pressure present in the container, the author's efforts were directed towards separating, as a homogeneous and pure material, the ethane and propane present in the heavier or "wet" gases from oil wells. The simple compression of such material produces a condensation of all the hydrocarbons present, including hexane and pentane, and considerable quantities of ethane, propane, and butane. Some preliminary experiments were made to utilize this condensate; but the fact that it was entirely lacking in homogeneity, and that the gases given off in its volatilization were different from moment to moment, showed such a plan to lack feasibility. As a result of an extended series of studies, the author and his colleague succeeded last year in preparing pure products of ethane and propane—these having been separated from natural gas condensates by a system of fractionation based on selective condensation on heated coils. The principle involved in the separation of these pure products consists primarily in the vaporization of all the hydrocarbons present under a very high pressure, usually from 800 to 1000 lbs. per square inch; and while under this high pressure condensation is effected upon coils which are heated intermediately between the critical temperatures of part of the gases present. As a result, it was found possible to separate entirely hexane and pentane from the ethane and propane, and to liquefy the ethane and propane in separate containers.

When successful experiments had been made in the preparation of a pure liquefied product, work was at once taken up towards the commercial preparation of the material; and in the summer of 1911 the new product was exhibited to a number of people, and very careful experimental work was carried out to determine the exact properties of the new gas.

At the present time, the distribution of "Gasol" is proceeding on a rapidly increasing scale, and the material is being produced at a cost which enables isolated dwellings to be lighted at a figure no greater than that which corresponds to city gas at $1 per 1000 cubic feet. The great importance of this result, from a commercial standpoint, is hard to realize. The production of the new gas is covered by a series of patents, which are held by the American Gasol Company. The actual production of gas is made through a series of subsidiary companies, working under a licence agreement; and these companies are being formed in a number of States, with the expectation of increasing business to a very large extent in the coming year.

The commercial preparation of "Gasol" involves the compression of "wet" natural gas, with consequent liquefaction of a large part of the hydrocarbons contained in it, the separation of the more easily condensed products, particularly hexane and higher isomers, and the rectification of the remaining product by means of selective condensation upon heated coils while the gas is under high pressure, usually in excess of 1000 lbs. per square inch. The heated coils are maintained at such temperatures as to cause the separate gases to condense one after another, depending upon the relation of their vapour pressure to the temperature of the coil and the pressure existing within the rectifier. The "Gasol" produced is a perfectly colourless and transparent liquid, which remains in this condition at a temperature of −70° C. or lower, but which in normal conditions of temperature only exists in the form of a liquid when under a pressure in excess of 400 lbs. per square inch. Any release of this pressure causes it to change at once into gas; the gas having the remarkably high calorific power, when expanded to atmospheric pressure, of 2400 B.Th.U. per cubic foot. The gas may be burned in the ordinary mantles of all types, and, through the use of reducing-valves, it may be equally well used in house lighting under the low or the high pressure distribution system. The liquid is distributed in steel bottles, about 55 inches high and 8 inches diameter, each bottle holding 40 lbs. of the liquid gas, and producing the equivalent in heating power of somewhat over 2000 cubic feet of ordinary coal gas.

The experimental development of "Gasol" has been going on for more than a year, and its commercial use dates back a few months. It is now being used in the lighting of country dwellings, where the only care given to it is the exchange of bottles as an old bottle becomes empty (usually about once a month); and, in actual practice, for the lighting of country houses this gas has proved to be remarkably well suited. The light it gives with the inverted Welsbach mantle is superior to that which can be produced from either natural or coal gas; and for cooking the gas is also very satisfactory—giving a small but intensely hot flame, and free from even the slightest deposition of soot. The distribution of outfits for supplying the new gas is being pushed energetically; and it is hoped that within the next year the distribution of the gas will have been carried out upon a sufficiently large scale to indicate fully the commercial possibilities of the new product.

* As bearing upon this subject, reference may be made to a paper on "Treating the Liquefied Products from Natural Gas" which appeared in the "JOURNAL" for the 7th of May last (p. 371).—ED. J.G.L.

WATERPROOFING A RESERVOIR DIVISION WALL.

A recent number of "Engineering Record" contained an article by Mr. J. B. Landfield giving particulars, with illustrations, of the waterproofing of the division wall of a large reservoir forming part of the high-pressure fire service in San Francisco. The reservoir is a noteworthy structure, and is located at an elevation of 750 feet above the business section of the city. It is in the shape of an oval cup in an excavation on a mountain, and is 370 feet long, 285 feet wide, 27 feet deep, and when filled holds 11 million gallons. It is divided into two sections by a partition wall; the object being to permit the emptying of one side for cleaning or repairs without leaving the city unprotected. The wall is of concrete, 12 inches thick, and supported on either side by buttresses at intervals of 9 feet. When water was first pumped into the reservoir, it was found that, in spite of all the precautions taken, a considerable quantity found its way through the wall; and it was therefore decided to make a trial of the cement gun for the purpose of waterproofing it—this being the first time the process had been used on a job of the kind on Pacific Coast. A mixture of one part of portland cement to three parts of graded sand, with the addition of a small quantity of hydrated lime, was used; and it was applied to the walls and buttresses on both sides with the gun to a thickness of ¼ inch at the top, increasing to ½ inch at the bottom.

The wall was thoroughly wet before applying the gunite, and care was taken to keep the material wet for some days after it was placed. The surface covered was about 3200 square yards, and the work was done in eight days—one gun working continuously eight hours a day, and the second gun about half the time. Immediately after the gun work was finished, water was pumped into the reservoir at the rate of 2000 gallons per minute by an auxiliary pumping-station, equipped with steam-turbine four-stage pumps, capable of furnishing a pressure of 300 lbs. per square inch; and one side was filled to a depth of 25 ft. 6 in. At the end of 24 hours, a few moist spots appeared on the wall and at the junction of the wall and floor; showing that there was a slight seepage. At the end of 48 hours, however, the damp spots entirely disappeared, and all seepage stopped. The result indicated that a cement plaster applied by compressed air, as is done by the cement gun, fills the voids and makes a concrete so dense that it is entirely waterproof.

The reservoir was dedicated in the presence of more than 20,000 people. One half was full of water, and the other half, which was perfectly dry, was used as an auditorium in which the ceremony took place.

It appears that the principal cause of leakage was found by a board of engineers to be due to four factors: (1) A defective type of unsupported expansion joints; (2) inferior workmanship as to the shape of joints; (3) defective system of inspection, which did not disclose the true condition of the joints; and (4) imperfect adhesion in places between the asphaltum filling and the walls of the concrete slabs.

The "Engineer" points out that while the necessity of providing for expansion in long ranges of steam-pipes is generally recognized, steam users sometimes overlook the importance, where such an expansion arrangement consists of a stuffing-box device and the ends of the length of piping are not anchored fast, of providing guard-bolts to prevent the two parts being drawn asunder. The danger arising from the absence of such a provision is drawn attention to in "Vulcan," and a failure is mentioned which occurred at a tinplate works in Glamorganshire last March. There was a short length of pipe between the engine stop-valve and the steam main leading to the boilers. The main and the short length were each fitted with a stuffing-box arrangement; but while that in the main was furnished with guard-bolts, the branch piece was not so provided, and when the pipes were put into operation the two parts of the short length were drawn asunder and allowed steam to escape, which scalded a labourer assisting on the job.

REGISTER OF PATENTS.

Gas Distribution Valves.

ROBERT DEMPSTER AND SONS, LIMITED, and HORSFALL, J. E., of Elland.

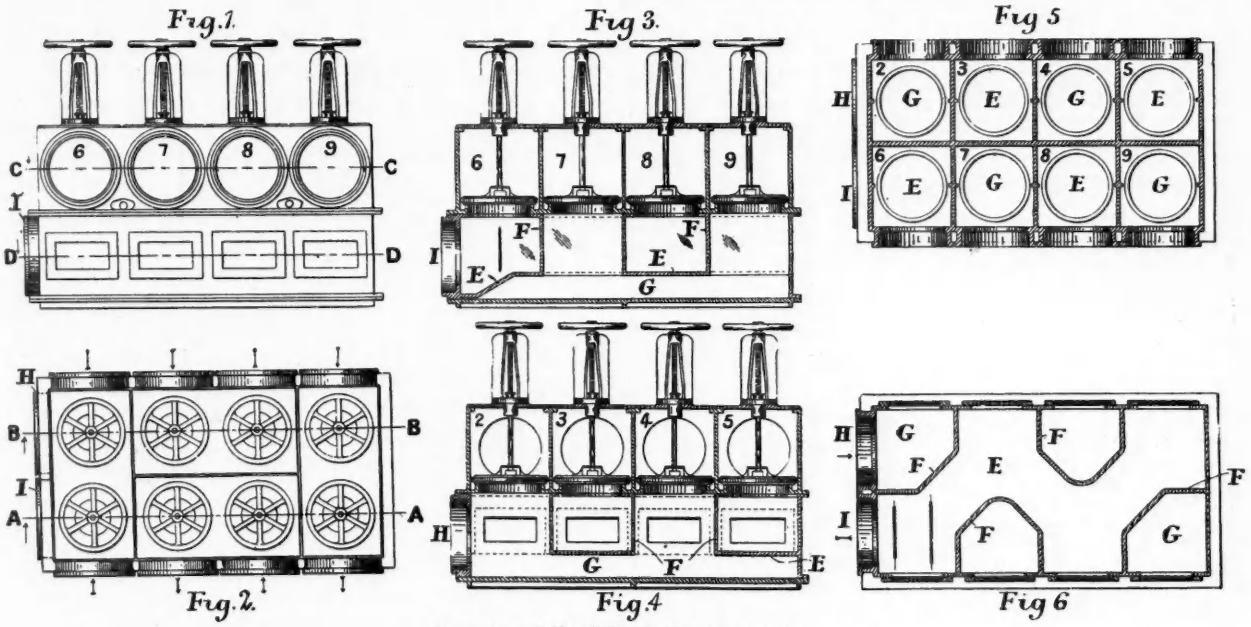
No. 24,720; Nov. 7, 1911.

This is a modified form of the Weck valve, described in patent No. 2878 of 1882. The device constructed according to the present invention resembles an ordinary Weck centre-valve (as used in purifiers); but the top hoods are dispensed with—that is, only the wheels and bridges are placed over the top of the socket compartment, so that each valve only acts on the lower seat, instead of upon the upper and lower seats as usual.

Fig. 1 is a side elevation of a valve-box constructed in accordance with the invention. Fig. 2 is a plan. Figs. 3 and 4 are sectional elevations on the lines A and B in fig. 2. Fig. 5 is a sectional plan taken on the line C in fig. 1 (all the disc valves in figs. 3 and 4 being assumed to be raised). Fig. 6 is a sectional plan taken on the line D.

The upper portion of the valve-box is divided into eight compartments (2 to 9), in each of which works a disc-valve capable of being operated by a hand-wheel. The gasholder inlets are connected to the compartments 2, 4, 7, and 9; while the gasholder outlets are connected to the compartments 3, 5, 6, and 8.

The lower half of the box is divided from the upper half by a horizontal partition pierced by eight circular apertures (fig. 5), each opening into one of the compartments of the upper half, the walls or ascending flanges of which apertures form the seats of the disc-valves, which are adapted to close the apertures. In this portion of the box is a partial false bottom E, connected by vertical partitions F with the horizontal partition in such manner that any or all of the compartments 3, 5, 6, 8



Dempster and Horsfall's Modified Weck Valve.

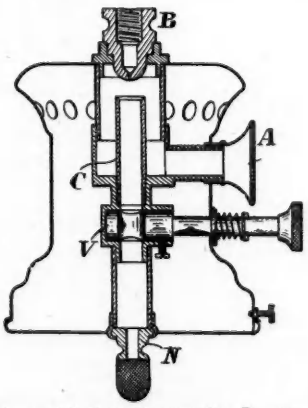
can (by raising the appropriate valve or valves) be put in communication with the space above the false bottom; while the space G below the false bottom can similarly be put in communication, through the vertical passages outside the partitions F, with any or all of the remaining upper compartments 2, 4, 7, 9. The box inlet H from the meter opens into the space G, and the box outlet I to the governor is situated in the end wall of the box above the false bottom E. It will, therefore, be obvious that by actuating the hand-wheels—for example, to open their respective valves—one gasholder can be put in communication with the meter through H, G, and 7, and with the governor through 8 and I.

Incandescent Gas-Burners.

BERNARDY, E., of Bradford.

No. 4965; Feb. 28, 1912.

This invention relates to means for regulating the supply of gas and air mixture to the burner.



Bernardy's Incandescent Gas-Burner.

The burner shown is fitted with a valve adapted for use with high-pressure gas, wherein the preheating of the mixture is advantageous and may be applied. A is the air-admission opening, and B the gas-inlet. C is a mixing-tube, in which the valve V is placed, and from which is carried the mantle. The valve is so arranged that the fairway of the mixing-tube can never be completely closed by it, and to accomplish this end the plug is cut partially away, and on the spindle is formed a recessed flat adapted to be engaged by a regulating screw contained in the valve body or casing shown. If this were screwed tight on to the flat, then, of course, the valve would be held fully open, and to allow of movement the screw would be released somewhat. The further the end of the screw is from the flat, the more can the valve be turned to obstruct the passage of the mixture through the mixing-tube; and the screw will be so arranged as to be incapable of complete withdrawal.

The valve serves to regulate the quantity of air required, and the operation of it increases or decreases the velocity of the mixture, and determines the quantity of air drawn in. To ensure vibration or the like not affecting the valve, a spring is employed. From the mixing-tube the mixture passes through one or more passages to the burner nozzles N, and thence to the mantle or mantles.

Indicating the Opening and Closing of Valves at a Distance.

SOCIÉTÉ COURTAUD G. GARNIER GIL ET CIE., of Paris.

No. 7852; April 1, 1912. Convention date, Oct. 16, 1911.

The present invention relates to a form of apparatus which has for its object to remedy certain defects in that described in patent No. 7780 of 1912. In this modification of the form of receiver described in the prior specification, the shaft which carries the graduated disc and the operating pinion of the slide or vane carries a loose ratchet-wheel for each direction of rotation, and a boss mounted on a long feather and capable of displacement longitudinally on the shaft—the displacement of the boss being produced by a fork lever oscillating under the action of two electro-magnets mounted respectively in series with one of the electro-magnets which actuate the pawls of the ratchet-wheels. There is also provided a channel which carries armatures intended to produce the movement of oscillation of the lever controlling the boss, and in which there moves a ball intended to supplement the action of the electro-magnets.

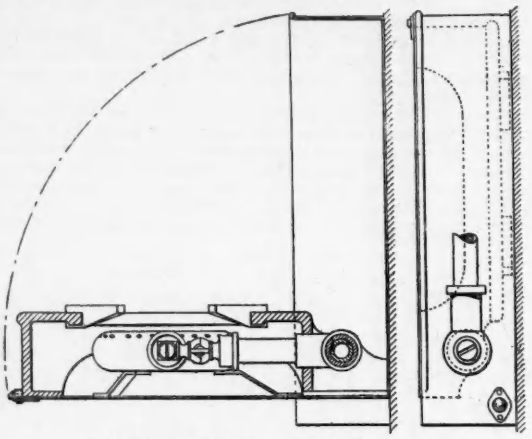
Gas-Bracket for Heating, Cooking, and Like Purposes.

BROOKS, R. A. E., of Kilburn, N.W.

No. 28,826; Dec. 21, 1911.

The object of this invention is to combine a gas ring or burner with a cabinet in such a manner that the combination may be fixed to a wall, in which position the ring or burner, with or without a hot-plate, can be turned down for use in heating, cooking, and like purposes, and, if desired, the gas to the burners be automatically turned on. The

burners can be also turned up into the cabinet, and in so doing the gas may be automatically turned off and the burner hidden from view. An auxiliary tap provides for regulating the height of the flames at the burners.



A Folding Gas Heating and Cooking Stove.

The illustration shows a side (part sectional) elevation of the appliance with the burners in position for use; the gas-supply pipe in the cabinet being part of the burners and acting as the pivot, and provided with one portion of a valve. There is also a side elevation of the apparatus closed.

Incandescent Gas-Mantles.

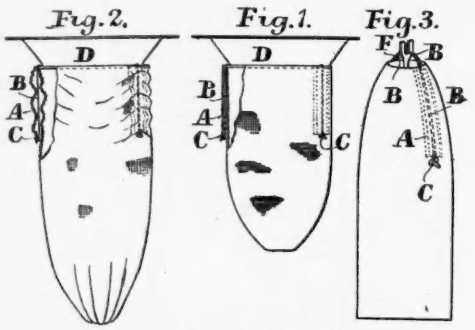
ZECHNALL, L., of Bunhill Row, E.C.

No. 1367; Jan. 17, 1912.

This invention relates particularly to large mantles, provided with means (auxiliary or supplemental to the ordinary attachment) whereby, should the mantle break away from the ordinary fastening, the mantle will be held in position.

It has been proposed, the patentee points out, to strengthen mantles by attaching to the mantle-ring wire, threads, or cords of asbestos passed through the fabric of which the mantle is made or around the outside of the mantle; and mantles have also been supported by a wire or cord passed through a hollow hem around the top of the mantle. This method, however, is unsatisfactory, in view of the shrinkage in the threads of the mantle fabric when incinerated and the practically unshrinkable nature of the asbestos or like thread. It has also been proposed to provide a mantle with long tubular sleeves into which project (for a short distance only) depending lugs on the solid member of the mantle support.

According to the present invention, there are formed upon the sides of the mantle in suitable positions elongated sleeves or tubes open at both ends and of the same material as the mantle, and extending downward or away from the supports; and through each sleeve or tube is threaded or passed a supporting thread or rod. The thread or rod is enlarged at its lower end where it protrudes from the sleeve; and its upper end is fastened to the ring or collar which supports the mantle. Should the body of the mantle then become detached from its holder it will be suspended by the cords or rods, the larger ends of which prevent the sleeves from slipping off.



Zechnall's Incandescent Gas-Mantles.

In the construction shown in fig. 1, three or more equally spaced vertical sleeves A are employed, each made from a strip of mantle material stitched in position; and through the sleeve so formed is passed a thread of asbestos B, which is tied in a knot at C or provided with a hook or button at its lower end, so as to support the mantle by the sleeves should it become detached from the holder D, to which the upper end of each cord is fastened in any suitable way. The mantle is supported in any suitable manner from the holder D.

As, when incinerated, the mantle shrinks to a considerable extent, it will be provided with a sleeve longer than the cord which is passed through it—the material of the mantle and sleeve being gathered up somewhat as indicated in fig. 2.

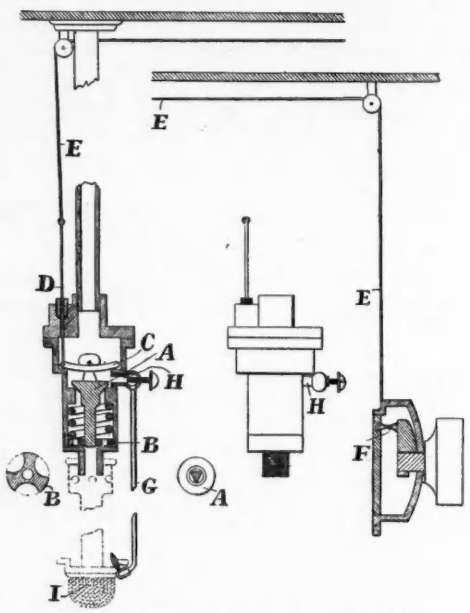
Fig. 3 shows an upright mantle having the invention applied to it. In this arrangement the mantle is suspended as described by cords B and sleeves A from the ring, collar, or cord F with which such mantles are usually provided.

Lighting and Extinguishing Gas-Burners from a Distance.

ETOURNEAU, A., of Nantes, France.

No. 9650; April 23, 1912. Convention date, Feb. 14, 1912.

This invention relates to gas-burners adapted to be operated from a distance by a switch which, when rotated, tensions or releases a chain connected with a lever on the burner or adjacent fitting, and adapted, when oscillated, to open the valve, or allow it to close under the action of a spring. The switch is in the form of an eccentric which is capable of rotation in either direction, so that a half-turn effects either the opening or closing of the gas-valves. The chain passes from the switch over guide-pulleys as usual, and is then connected to a rod passing through a stuffing-box on the valve-casing and attached at its inner end to the valve-operating lever which is inside the casing.



Etourneau's Switch Lighter and Extinguisher.

In carrying out the invention according to the mode illustrated, the lighter proper comprises three parts—a main casing and upper and lower branches, for screwed connection to the gas pipe and burner proper. The main casing is provided inside with a seating for a valve A, normally held to its seating by a spring abutting at one end against the underside of the seating and at the other end on a perforated or notched washer or disc B, securely mounted on the valve-stem. The valve is controlled, on the other hand, by a lever C, which is connected through the medium of a rod D, sliding through a gland in the casing and a chain or cable E of any desired length, and passing over guide-pulleys (varying in number according to the installation), and finally connected to an eccentric F of the so-called switch. The arrangement is completed by a bye-pass G, secured at one end in a screwed nipple H, inserted in the front of the valve or its seating, and furnished with an adjusting screw by which the intensity of the bye-pass flame at the mantle I can be regulated.

Assuming the parts to be in the positions shown, with the burner shut off and the bye-pass alight, to light the burner the handle of the switch is given a half-turn in either direction so as to rotate the eccentric through 180°. The eccentric thereby raises the valve A against the action of the spring, through the medium of the chain E, rod D, and lever C, whereupon gas passes freely to the burner, and is ignited at the mantle by the bye-pass flame. When the eccentric is in this position (180° from the normal or that corresponding to extinction), it remains in the same position and maintains the lighter in the alight position. By turning the handle in the opposite direction, the lever C is released, and the valve A closes on to its seating under the action of the spring. The flow of gas is thus interrupted and the burner flame extinguished. But, owing to the position of the nipple H, the bye-pass remains alight.

Electro-Magnetically Controlled Gas-Valves.

LA COMPAGNIE DU GAZ ELECTRIQUE, of Billancourt, France.

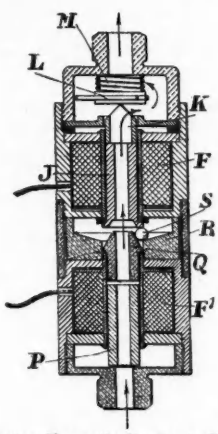
No. 14,466; June 20, 1912. Convention date, April 17, 1912.

The invention relates to a gas-valve controlled from a distance by an electric current, and comprises electro-magnets arranged to open and close in succession a valve controlling the passage of the gas to (more especially) "powerful burners having one or more flames of large consumption, which are now much used for brilliantly lighting public streets or industrial or commercial buildings."

The apparatus consists of two electro-magnets, one above the other—the movable core of one controlling directly the gas-valve, and that of the other serving to dislodge a ball which keeps the valve raised after the opening current has ceased. When the ball is dislodged, the valve can fall freely to cut-off the gas supply as soon as the flow of closing current ceases. This construction is said to present the advantage that the valve is quite stable in its open position—"this condition

being essential for preventing premature extinction of a burner subjected to continual vibration like an ordinary street-lamp."

The apparatus shown operates as follows: When the valve L is closed and rests on its seat, the two cores J and P are in their lower position; the upper core resting directly on the cylindrical piece Q. When current is caused to flow through the winding F of the opening magnet, the core J is lifted and raising the cylinder K lifts the valve L, thus allowing free passage for gas. During the rise of the core the ball S, rolling on the cone R, comes beneath the lower end of the core J, thus preventing the latter from falling again when the current is cut-off. Thus the valve L remains raised, and "is perfectly stable in the open position shown."



A French Electro-Magnetically Controlled Gas-Valve.

When current is passed through the winding F^1 of the closing magnet, the core P is raised and strikes against the cylindrical piece Q, which is thus lifted. As it rises, the piece pushes the ball S up the surface of the cone R, so that the core J is no longer held up and can fall under action of its own weight, until it rests directly on the top of the piece Q. As soon as the current is cut off from the winding F^1, the whole system of cores J and P and piece Q fall automatically into the lower position, being aided by the pressure of the spring M. The valve L is thus again closed.

Owing to the space between the core P and the cylindrical piece Q, the rising core strikes the piece Q, and thus ensures the dislodgment of the ball from its position beneath the core J; and in this manner failure to extinguish the light is avoided.

The construction of the apparatus as shown permits of any desired section being given to the passage for gas through the cores J and P and the cylindrical piece Q, "so that a sufficient supply of gas can be ensured even for burners of large consumption."

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents]

Tar Prices.

SIR,—What interests are at work to cause the drop in the price quoted for pitch in the weekly journals lately? I have made searching inquiries, and find no reason other than a desire by interested parties, not a hundred miles from the East coast, to bring about a slump such as has been attempted before. I had hoped that this sort of thing would not be again tried on, and consider it particularly unfortunate in view of the fine experience of the two past seasons, and the present very healthy demands and inquiries for "forward" business. There is certainly no justifiable reason for the present attempt to break the market.

TAR MAKER.

Aug. 31, 1912.

The "Shadowgraph" Method of Testing Gas-Fires.

SIR,—We have read the two letters from Mr. Fletcher criticizing the above, the first of which is very suitably answered by your editorial comments at the foot of it. May we be allowed, however, as briefly as possible, to reply to the second letter appearing in your issue of the 27th ult.?

It is, in the first place, quite apparent to all who have read the above article that Mr. Fletcher, in his summing-up of what he considers the "real situation" (and from some of the remarks in his first letter), has utterly failed to grasp both the object of this method of testing and its application.

We quite appreciate the fact that, to the gas-stove manufacturer who still applies the old rule-of-thumb methods in the creation and production of his goods, the shadowgraph test may seem superfluous and elaborate. We can assure Mr. Fletcher, however, that it is simple, compared to the means adopted by those firms who, during recent years, have combined science with practice in favour of these unsatisfactory rule-of-thumb methods.

Mr. Fletcher states that if a maker understands the rudiments of correct gas-fire construction there is no need for such a "device." We may state in conclusion that the results we have obtained with this "device," as he terms it, prove conclusively that unhappily there are several makers to-day who either do not understand the rudiments of gas-fire construction or do not know how to apply them.

Luton, Sept. 2, 1912. THE DAVIS GAS-STOVE COMPANY, LTD.

MISCELLANEOUS NEWS.

AUSTRALIAN GASLIGHT COMPANY.

The Annual General Meeting of this Company was held at the Royal Exchange, Sydney (N.S.W.), on the 29th of July—Mr. G. J. COHEN (the Chairman) presiding.

The SECRETARY (Mr. R. J. Lukey) having read the notice convening the meeting, the report of the Directors for the half year ended the 30th of June was presented and taken as read. It was stated therein that the profits, with the balance brought forward, amounted to £72,087; and the Directors recommended the payment of a dividend of 9s. per share for the six months. This would absorb £63,750, and leave £8337 to be carried to the next account. They regretted, however, that the payment of the dividend must be deferred, as owing to the unexpected delay in completing negotiations with the Government as to the resumption of the Kent Street property, and in obtaining the approval of Parliament to the Bill asking for authority to increase the capital and the borrowing powers of the Company, they had been compelled, in the interests of the public and the Company, to expend a very considerable portion of the profits earned in absolutely necessary extensions and plant. The Directors expressed the hope that within a very short time they would be able to overcome these difficulties, and pay the dividend. They added that the Government had not informed them of the decision regarding the resumption of the Company's head station [to which reference was made in the "JOURNAL" for June 25 last, p. 1003], though it had been publicly stated through the Press that the Cabinet had decided to do so.

The CHAIRMAN, in moving the adoption of the report, said it afforded him much pleasure to state that the increases in the sales of gas for the past few years, as well as in the Company's business generally, had been fully maintained in the six months covered. The truth of the saying that "Prosperity brings corresponding obligations" was never more fully exemplified than in connection with the affairs of the Company, particularly during the past six months; causing the Directors and officers more than ordinary anxiety. Before referring to the accounts, he should like to mention one or two matters of much importance regarding the Company's future operations. As the proprietors were aware, the whole of the capital had been called up and the borrowing powers exhausted. Acting upon the authority given at the last half-yearly meeting of shareholders, a Bill to enable the Company to increase their capital and borrowing powers was presented to Parliament at the commencement of last session, and passed through the Legislative Council. Its course through the Legislative Assembly, however, met with unexpected opposition, as on its second reading the very unusual course of referring it to a second Select Committee was adopted, with the result that, after examining the Secretary for several hours, Parliament went into recess before the Committee had presented their report. Parliament having reassembled, the Company were petitioning the Legislative Council to proceed with the Bill; and he expected it would be ready for introduction in the Legislative Assembly at an early date, when it was hoped that it would become law. The Directors, anticipating that the further powers asked for by the Company would be readily granted by Parliament, did not hesitate to proceed with necessary work to meet the rapidly increasing requirements of the public in the Company's area, involving a very considerable expenditure of money. But on finding that their anticipations were not realized, they had been compelled to put a stop to many of the extensions which should be completed, and discharge a number of men. He could not understand the action of Parliament in delaying the passing of the Bill. As he had said on previous occasions, the interests of the consumers had always been studied, not only by supplying gas of high illuminating power at a reasonable figure, bearing in mind the rate of the wages paid and the cost of material in Australia, but, for instance, when it became necessary, during the late coal strike, to meet a loss of about £70,000, instead of raising the price of gas, which the Company would have been justified in doing, they preferred to bear the whole of the additional burden rather than that the public should suffer. With reference to the resumption of the Company's head station, of which the Directors had not received any official communication from the Government, the Press in May last announced that the Cabinet had come to a decision in the matter; but there, so far as the Company were concerned, the matter ended at present. No one regretted more than the Directors the necessity for delaying the payment of the dividend earned during the past six months, and justly due to the shareholders. But, relying upon the passing of the Bill, the Directors did not hesitate to expend money and incur other obligations which would shortly have to be met; and with this in view, the Board were compelled to recommend that the payment of the dividend should be withheld for the present. Referring to the operations of the Company, the increase in the consumption of gas during the half year was equal to 12·8 per cent., which was 2 per cent. more than the previous six months' figures; the quantity of gas sold being 1,495,879,000 cubic feet, or 170,045,000 cubic feet more than in the first half of 1911. It was very satisfactory indeed to note, in this connection, that the day consumption was equal to 50·2 per cent. of the total, which was a record in the annals of the Company. The consumers numbered 104,863; showing an increase of 3369 for the half year. There was a small decrease in the public lamps, brought about by the preference of some Municipal Councils for electric light. The number at present in use was 10,518. Gas-cookers furnished a very satisfactory as well as an interesting return; 2217 having been disposed of in the half year, against 1346 in the corresponding period of 1911. The total number disposed of by the Company to date was 26,712. But as a large number of other makes of stoves than the "Eureka" had been sold in the city, the Directors had no means of ascertaining the exact number. The length of mains and services laid in the half year had increased 70 miles; making a total length of 2701 miles. Before concluding, he should like again to express the Board's regret respecting the delay in the payment of the dividend—an experience in the history of the Company which he trusted would never have to be repeated. He should

also like to assure the shareholders of the undoubted stability of the Company. He then moved—"That the report of the Directors for the past half year be received and adopted, and that this meeting do order and determine that a dividend for the half year be declared at the rate recommended therein—viz., 9s. per share; the date of payment to be left to the discretion of the Board of Directors."

The DEPUTY-CHAIRMAN (Hon. Henry Moses, M.L.C) seconded the motion; and it was carried unanimously.

The retiring Directors and Auditors having been elected for the ensuing twelve months, a vote of thanks was unanimously accorded to the Directors and officers, for their very efficient management of the Company's business, and for special services rendered by them during the past six months.

The CHAIRMAN briefly acknowledged the vote, and the proceedings closed.

BARNET DISTRICT GAS AND WATER COMPANY.

Progress in Both Departments.

The Half-Yearly Meeting of this Company was held last Friday, at the Holborn Restaurant, W.C.—Mr. ALFRED H. BAYNES, J.P., in the chair.

The SECRETARY (Mr. Ernest W. Drew, F.C.A.) read the notice convening the meeting; and the Directors' report and the accounts were taken as read.

The CHAIRMAN remarked that he very much regretted the absence from the meeting of three of the Directors; and in the case of one of them (Mr. J. L. Chapman) he was exceedingly sorry for the cause. Mr. Chapman wrote that he had suffered injury to his foot through an accident, and that his doctor had told him that it would be a month before he would be able to walk properly again. The Deputy-Chairman (Dr. J. W. L. Glaisher) had been away in Switzerland; and important business had called Mr. A. F. Phillips to Paris. Turning to the business of the meeting, he said it was with considerable satisfaction that he moved the adoption of the report and accounts for the half year to June 30. He regarded it as a very encouraging report, indicating progress in both departments of the undertaking—largely due to the able and valuable services rendered by their Engineer and Manager, Mr. F. J. Bancroft—and felt confident that the proprietors would join with the Board in congratulating Mr. Bancroft and the staff working with him upon the results obtained. Referring first to the Gas Department, the prominent, outstanding feature of the past half year in this branch of the Company's undertaking had been the coal strike. Fortunately, the Engineer had accumulated a good stock of coal, and they were able to maintain the gas supply, and could have continued doing so for several weeks longer. At the time, the prolonged stoppage caused great anxiety, and in order to be quite safe some comparatively small purchases of coal were made at increased prices. To compensate for this trouble, the consumers undoubtedly saw the advisability of using gas for all possible purposes, to save buying coal at strike prices. Gas proved "a friend in need," and as a result the half-year's revenue account had been very satisfactory. The receipts from the sale of gas for private and public lighting showed an increase of £794; the increase in the quantity of gas sold being 8½ million cubic feet, or 11 per cent. more than in the corresponding period of the previous year. The rental from meters and stoves exhibited an increase of £179. The returns from residual products were more by £407; and the total increase on the receipts side of the revenue account was £1378—a very satisfactory figure, when it was remembered that during the whole of the half year now under consideration the price of gas was 2d. per 1000 cubic feet lower than in the corresponding half year. It was a matter of regret that there was not more building in the gas district. At present there was somewhat of a lull; but doubtless the development of the area was only delayed. It was, however, satisfactory to note that the total number of gas consumers was now 6132—an increase during the past half year of 162. Every effort was being made by the distribution department to secure new business, and the sales from the Company's show-rooms continued to give very gratifying results to both the Company and the consumers. On the expenditure side of the revenue account, he would point out that coal showed an increased cost of £632; 6896 tons having been carbonized during the half year, as compared with 6415 tons in the same period of the previous year. As a testimony to the efficiency of the retorts, and the supervision of the carbonizing department, he might mention that they had had the satisfactory make of 13,345 cubic feet per ton of coal; the quantity of gas sold being 12,496 cubic feet. This make, he thought the shareholders would agree with him, was extremely good. Repairs to works cost £636 less, and repairs and renewals to mains and services £591 more than in the preceding year; and it might here be noted that the unaccounted-for gas was reduced practically by ¾ per cent. Repairs and renewals of stoves and fittings also exhibited an increased expenditure of £478, due to the extended use of such apparatus, as well as to the efficient maintenance of the stoves already on hire. The total expenditure for the half year was £15,706, and the balance carried to profit and loss account £4476—a slight increase over the corresponding six months. On referring to the gas capital account, it would be seen that £155 was expended on new buildings; but there was a credit to mains and services and meters, giving a net credit to gas capital of £122. Before leaving the gas accounts, he would point out that, in order to be prepared against a recurrence of coal troubles, the Directors were now installing plant for the production of carburetted water gas, and this would be available for use next winter.

In the Water Department, they had had an excellent six months. This year there had not been the prolonged drought which was the marked characteristic of last year. Even, however, if there had been continued dry weather, the Company could have well met all demands. Owing to the admirable supply of water at Tyttenhanger, the Company were now in an excellent position, and were giving an ample supply to all their consumers. The Directors recently paid a visit to the Tyttenhanger pumping-station, and were very pleased with the working of the new machinery. They could assure the shareholders and the consumers that this pumping-station was a most valuable asset, both to the undertaking and the district. It would be seen that the capital expenditure for the half year was £3805, which was mainly on account of the new duplicate pumping plant at the Tyttenhanger works. The net receipts from water-rates were £21,190, an increase of £827 on the corresponding half year, which could not but be considered satisfactory. Turning to the expenditure, the amount required for the repair of mains, &c., was £340 more. Pumping and engine charges, however, showed the substantial reduction of £737, due principally to economy effected by the use of the Tyttenhanger pumping-station. The Company connected 224 new water-services in the half year; and the demand for water in this period had been greater than ever before in the history of the undertaking. The total cost of maintenance was £8157, a decrease of £420. Management expenses did not show much variation from the corresponding half year, except that law charges were £362 less. The total expenditure on water revenue was £9470, and the balance carried to the credit of profit and loss £11,798—a very pleasing increase of £1543.

The credit balance brought forward, after paying the dividend for the previous half year, was £19,591. The credit balance on the gas and water revenue accounts for last half year, and including a small profit on fittings, amounted to £16,385, making the total credit £35,977. A sum of £2000 had been transferred to the contingency fund; and he would here point out that £3000 had been written off from this fund for old and disused plant. The charges for income-tax and interest on debenture stock, &c., required £2679. These payments left a new credit balance of £31,297; and the amount required for the payment of the dividends recommended was £11,618, which would leave a balance to be carried forward of £19,678—a slight increase on that brought forward at the commencement of the last half year.

Mr. ALFRED LASS, F.C.A., seconded the motion for the adoption of the report and accounts, and it was at once carried unanimously.

On the proposition of the CHAIRMAN, seconded by Mr. LASS, dividends were thereafter declared, less income-tax, for the half year, at the rate per annum of 8 per cent. on the "A" and "C" stocks, 7 per cent. on the "B" stock, and £5 12s. per cent. on the "D" capital gas and water stocks.

Mr. LASS then proposed that the best thanks of the meeting be given to the members of the staff. They had, he said, in Mr. Bancroft a splendid Engineer; they had in the Secretary (Mr. Drew) a man who thoroughly understood his business; and he felt sure that they and all the members of the staff were doing everything they could to promote the interests and welfare of the Company. The Directors were fully satisfied with the work the staff had done during the past six months; and it was only due to them that they should be thanked for it.

Mr. W. B. BRYAN, in seconding, said he had gone through the balance-sheet with very great care, and was struck with the fact that the greatest skill and desire for economy must have pervaded the staff to produce the results that had been laid before the shareholders. He congratulated the Directors on having such an efficient Engineer as Mr. Bancroft, and such an efficient staff, who had worked so hard for the benefit of the proprietors.

The CHAIRMAN supported the vote, which was heartily accorded.

Mr. BANCROFT, in response, said the members of the staff thoroughly deserved the vote of thanks. Speaking for himself, he was very much more at ease in his mind now than he was at the corresponding time last year. Then they were in the midst of the long drought, which was followed in the winter by the coal strike. All these troubles had been satisfactorily surmounted; and he had no hesitation in stating that the undertaking was now in a much better position than it ever had been before.

Mr. DREW also replied for the secretarial department.

The proceedings concluded with a vote of thanks to the Chairman and Directors, which was passed on the motion of Mr. A. J. RUSSELL, seconded by Mr. H. STONEHOUSE.

HARTLEPOOL GAS AND WATER COMPANY.

The Directors of this Company, in their report presented at the annual meeting last Thursday, stated that the revenue for the year had been £92,321, and the expenditure, including interest on loans, &c., £59,076; leaving a balance of £33,245 as profit. An interim dividend was paid in March last, and the Directors recommended that the sum of £1500 should be set aside to meet the cost of the renewal of worn-out retort-benches, and that a dividend should be paid for the past half year at the rate of 5 per cent. per annum on the whole of the paid-up consolidated capital of the Company, less income-tax. The sales of both gas and water showed a favourable increase in comparison with those of the previous year, and all the reservoirs of the Company were full and overflowing. The recent coal strike had caused much anxiety, and considerable extra expense; but during the whole of the time of the strike a full supply of gas of the usual quality was maintained, thereby avoiding much inconvenience to the consumers. In moving the adoption of the report and accounts, the Chairman (Mr. O. K. Trechmann) congratulated the proprietors on the satisfactory results of another year's work, and on the fact that the amount earned enabled the Directors to recommend the full statutory dividend of 5 per cent. The improvement in trade during the whole of the year showed considerable progress, resulting, notwithstanding the coal strike, in increased sales of both gas and water; and the prospects for the current year were equally good, providing there was no repetition of strikes and labour disputes. Satisfactory agreements had been completed with the Corporations of Hartlepool and West Hartlepool for street lighting for a period of years. This was to the benefit of both the public and the Company; and it indicated that, for some years at any rate, the Corporations would not go in for lighting the towns entirely by electricity. In addition to the extra cost of coal, additional charges would have to be met to comply with the requirements of the National Insurance Act, and the increased premiums for workmen's insurance; but the Directors hoped that the increased receipts from residuals would enable them to meet these extra charges without making any increase in the price of gas. The report was adopted.

EASTBOURNE GAS COMPANY.

A Veteran Chairman.

The Ordinary Half-Yearly General Meeting of this Company was held on Monday last week—Dr. G. A. JEFFERY, J.P. (the Chairman), presiding.

The SECRETARY (Mr. J. S. Garrard) having read the notice convening the meeting, the report of the Directors, with the accounts for the six months ended the 30th of June, was presented. The latter showed a profit of £10,149 on the revenue account, and a sum of £20,692 available for distribution. The Directors recommended that dividends should be declared for the half year at the rate of £7 15s. per cent. per annum on the "A" stock, £6 5s. per cent. per annum on the "B" stock, and £5 per cent. per annum on the 5 per cent. preference stock. These payments would absorb £8785, and leave a balance of £11,907 to be carried forward.

The CHAIRMAN, in moving the adoption of the report, expressed his pleasure at meeting the shareholders again. There was, however, he remarked, no pleasure without some little alloy; and he could imagine that, having heard and read a good deal about the great coal and dock strikes, and what trouble had been caused by them, they trembled for their dividends. But on receiving the report their fears vanished, as they found their full dividends were assured. He would not deny that his colleagues and he had been suffering under very great anxiety—an anxiety greater than he, in any previous half year for more than fifty years, had ever experienced. However, by exercising wise foresight, the Directors had contracted for a large supply of cheap coal, which would carry them nearly to the end of the next half year. Their great trouble was in getting delivery of the coal; but fortunately they managed to pull through, and gave a full supply of gas both for lighting and for fuel. The proprietors must not forget that the Company had more than 8000 users of gas-cookers, who found gas cheaper than coal as a fuel. The Company gave an adequate supply of gas to their customers and the public without failure for a single day. They might ask how this was managed. The answer was by united effort. The Secretary (Mr. Garrard) and his staff, the Manager (Mr. Hammond) and his men, did their utmost to carry out the suggestions of the Directors under the circumstances; and the analysis which he would briefly give of the accounts would show very plainly how this was done and how the Company stood. The net profit for the six months was £10,149, against £9904 last year—an increase of £245. The number of consumers was now 5109 ordinary and 5436 prepayment meter—together 10,545, or a gain of 344. No fewer than 8255 consumers hired stoves. The leakage was 5·56 per cent., which was 1 per cent. lower than for the corresponding period of 1911. Coals and gas-making materials cost £15,216, against £17,096—a saving of £1880. The net expenditure on coals and oil was £5577, compared with £7386—a saving of £1809. The total cost was £21,738, against £22,713, which was less by £975, or nearly £1000. The receipts for gas and the rental of meters, stoves, &c., were £32,851, against £32,617—a gain of £234. The profit was £11,112, against £9904, or more by £1208. This profit admitted of assigning to the special purposes fund £963; leaving a surplus of £1364 over the dividend. The quantity of gas made per ton of coal was 11,396 cubic feet, against 11,130 cubic feet before—an improvement of 266 cubic feet. The coke for sale was 10·29 cwt., against 10·18 cwt., per ton; tar, 9·9 gallons; and the sulphate of ammonia made was 19·23 lbs., against 16·58 lbs., which was most satisfactory. This, then, was a short history of their doings in the past half year, and he would conclude by assuring the proprietors that the analysis he had given, coupled with the reduction in the cost of coal of 6d. per ton, had combined to produce an extremely profitable half-year's working, in spite of the coal and dock strikes.

The DEPUTY-CHAIRMAN (Mr. J. C. Towner) seconded the motion.

Mr. A. W. OKE expressed pleasure at the gratifying nature of the report. He remarked that when the stockholders considered the very great difficulty through which companies such as theirs had been passing in the last six months, the fact that the price of gas was only 2s. 6d. per 1000 cubic feet, and that, in spite of all the adverse circumstances to which the Chairman had referred, the profit was more than sufficient to cover the excellent dividend they enjoyed, was highly satisfactory; and it needed no words from them, except, he thought, of commendation and congratulation to the Directors and those working with them, on the excellent results they were able to put before the proprietors.

The motion was carried unanimously; and the dividends recommended were declared.

The retiring Directors and Auditor having been re-elected, the Directors' remuneration was increased to £1200 per annum.

The CHAIRMAN expressed his thanks, on behalf of the Directors, for this expression of the stockholders' confidence and appreciation.

The Directors' report contained a recommendation that the salary of the Secretary should be increased by £50 per annum; and a motion that this should be done—the advance to date from July 1, and the salary be free of income-tax—was proposed by Dr. BRANSBY ROBERTS, seconded by Mr. S. PIPE, and carried unanimously.

Mr. GARRARD, in returning thanks to the proprietors for their generous vote, said he should be remiss if he did not acknowledge that a great deal of his success had been due to the fact that he had been so strenuously helped by his colleague Mr. Hammond, who had been with the Company for a much longer time than he (the speaker), and whose sterling work they all warmly appreciated.

Mr. OKE moved—"That the best thanks of the stockholders be given to the Directors, officials, and workmen, for the care with which they have conducted the affairs of the Company, as shown in the accounts and the progress made." He said they had in a substantial manner recognized the services of the Directors and the Secretary. But there was their friend Mr. Hammond, who, he understood, had beaten his own record in the production of gas in the results of the past half year. They knew that a great deal of their dividend depended on the careful working of the retort-house. Dividends were often lost there, but never at Eastbourne. What with their excellent dividend, their good Board of Directors, and their excellent staff, they had abundant evidence that the Company was exceedingly well managed; and he felt sure the stockholders would be unanimous in passing this resolution of thanks to the gentlemen he had named.

Mr. ABRAHAM seconded the motion; and it was agreed to.

The CHAIRMAN, in the course of his reply, said the officials and workmen had done their utmost to meet the wishes and suggestions of the Directors. He was pleased that they had voted the increased salary to the Secretary.

A vote of thanks having been passed to the Chairman for presiding,

Dr. JEFFERY, in acknowledging the compliment, said this meeting made the hundredth he had attended in connection with the Company.

HARROGATE GAS COMPANY.

Electricity v. Gas for Cooking and Heating.

Though there were no report and accounts to be presented at the half-yearly meeting of the Harrogate Gas Company last week, the business being confined to the declaration of an interim dividend, the Chairman (Mr. F. Barber) furnished some particulars in regard to the progress of the undertaking in the six months ended the 30th of June. He explained that he was able to do this from a statement prepared by the General Manager (Mr. Harry Wilkinson), the figures in which he submitted with every confidence. They showed increased profit compared with the first half of the past year. The main factors which had produced this result were the increased sale of gas and the higher price realized on the sale of residuals. They had made 10½ million cubic feet more gas, and increased the sales by 5·4 per cent. The average yield of gas per ton of coal carbonized reached the very satisfactory figure of 11,326 cubic feet. They were able to pass through the troublous days of the coal strike without undue anxiety; it having long been the policy of the Company to keep a sufficient stock of coal to cover such a contingency. They were therefore able to discharge their statutory duty of supplying gas without the slightest restriction; and they would have been able to do so for many weeks longer. It was, however, a notable fact that during the period of the strike the consumption of gas remained normal—a position evidently brought about by the consumers avoiding all wasteful consumption. Notwithstanding the very great increase in the demand for coke during the strike, no advance was made in the price of that sold by the Company; and it was a matter of much satisfaction to the Directors and the management that they were able to meet the very large demand which sprang up for this class of fuel among the poorer classes. A rise of 1s. per ton in the price of coal meant an increased expenditure to the Company of £1400 to £1560 a year. It would therefore be understood how anxious the Directors were to secure their supplies on the most favourable terms. He was glad to be able to inform the proprietors that the schemes for improving the working conditions of the men, by the provision of bathing, lavatory, and messroom accommodation, had been completed. The Directors had also endeavoured to meet the exigencies of the position of all their skilled and unskilled workers, due to the increased cost of living and insurance charges, by special advances in the rate of wages. This policy had been justified by the loyalty of the workmen in the past, and had been fully appreciated by them. The increase in the wages-sheet amounted to some £600 a year. They had heard a good deal about the competition of electricity with gas for cooking and heating purposes, and so little did he think of the merits of electricity as a competitor in this direction, that he considered they might confidently leave the case for gas in the hands of the housewife who knew how to use it. He thought that, before owners of electricity undertakings invested any large amount of capital in experiments in the direction contemplated, they had better take into account the fact, which was now fully realized, that gas suppliers were on the eve of a great advance in the economic application of gas to these purposes, as well as for lighting. Whatever might happen, however, the policy of the Company would be based on the firm belief in the advantageous use of gas for everything to which it could be applied; and this belief would remain the incentive of the Board, the officials, and the staff. The Chairman concluded by moving the declaration of same interim dividends as last year; and the motion was carried.

GLOUCESTER GAS COMPANY.

A Progressive Undertaking.

The Chairman of the Gloucester Gas Company (Mr. R. V. Vassar-Smith) was able to present to the shareholders a very satisfactory report at the half-yearly meeting on Monday last week. It showed that, notwithstanding the reduction made in the price of gas, the revenue from the sales was higher, and the consumption had increased 6 per cent. The net profit for the half year was £6902, which allowed of the payment of the maximum statutory dividend at the rate of 5 per cent. per annum. Having regard to this satisfactory position, it was decided to reduce the price of gas by 1d. per 1000 cubic feet, to take effect next quarter, which will make the price of gas to the ordinary consumers, after deducting the discount for prompt payment, 1s. 9d. per 1000 cubic feet. By this reduction, the employees under the co-partnership scheme will receive an additional bonus of ½ per cent.; thereby increasing it for the current year to 7½ per cent. upon their wages. A reduction of 4d. per 1000 cubic feet has been made in the price of gas during the last three years.

When Mr. W. E. Vinson, the Company's Secretary, succeeded to the position on the death of his father in 1879, the price of gas was 4s. per 1000 cubic feet—a figure at which it had stood for some fifteen years previously. The number of consumers at that date was between 2000 and 3000, compared with some 11,000 or 12,000 now. In 1879, the consumption of gas was rather more than 100 million cubic feet; whereas at the present time it is approaching 400 millions. Thirty-three years ago, the gas offices were in a very modest building on the Quay, where the works were also situated for many years. But in

1881, the offices were removed to the handsome premises they now occupy. Since the latter date, the Company have opened spacious show-rooms for bringing before the public up-to-date appliances for the use of gas. The works at Hempsted have also been extended to meet the growing demand for gas. Thirty years ago, there were hardly any gas-cooking stoves in use; but now there is scarcely a house in Gloucester without one—the Company having some thousands out on hire. Side by side with the growth of the business, the capital of the Company has been increased; and from £90,000 in 1879 it now stands at nearly £230,000.

INCREASED GAS CONSUMPTION AT TONBRIDGE.

The Value of the Day Load.

In moving the adoption of the report at the half-yearly general meeting of the Tonbridge Gas Company on Monday last week, the Chairman (Mr. W. Judd) said it had been his pleasure for a number of half years to announce a considerable augmentation in the consumption of gas; and he was glad to say that, following on the records in the past, the increase for the past half year was 3¼ million cubic feet, which was one of the largest increases the Directors had had to report. More than this, he was pleased to say that during one week since the accounts had been made up—the first week in July—there was a rise of 250,000 cubic feet. The shareholders would therefore agree that the Company's affairs were prospering most satisfactorily. He attributed the large consumption during the summer months to the additional number of cooking-stoves and water-heating appliances in use in the town. The Directors believed there was a great future in store for gas water-heaters. Those at present installed were giving much satisfaction; and, with gas at the low rate of 2s. 5d. per 1000 cubic feet, they were much appreciated. The income from the sale of gas showed an increase of £300, notwithstanding the fact that there had been a reduction of 1d. per 1000 cubic feet in the price. Had this not taken place, the profit would have been nearly £600. Residuals were up all round; and thus the Directors were able to show a profit of £3069, from which £1981 was required to pay the dividends. The 3¼ million cubic feet increase in consumption was not entirely due to the reduction in price, but to the fact that the majority of consumers were burning gas in preference to coal; and he thought they would continue to do so while the price remained so low. An interesting fact was that in mid-summer the day consumption of gas was 61 per cent. and the night consumption 39 per cent. of the total. In mid-winter it was practically the same; being 59 per cent. in the daytime and 41 per cent. at night. This was an ideal condition for a gas company to be in. Mr. F. East, in seconding the motion, congratulated the Company on the increased consumption of gas, and said he believed they could look forward to a good balance-sheet in the near future. The motion was carried unanimously. The Chairman said he supposed the past half year had been one of the most trying periods Mr. Donaldson (the Engineer, Manager, and Secretary) had experienced since he had been a Manager. He therefore proposed that their best thanks be presented to the Manager, Deputy-Manager, and staff generally for the efficient manner in which they had carried on the business of the concern during the past half year. The motion having been carried amid applause, Mr. Donaldson returned thanks, on behalf of himself and the staff, for the shareholders' kind appreciation. A vote of thanks to the Directors closed the proceedings.

SOUTHEND GAS COMPANY.

A Satisfactory Increase.

In the report which was submitted at the half-yearly meeting of the Southend Gas Company last Tuesday, the Directors stated that the business of the Company was satisfactorily increasing, and the profit and loss account showed an amount available for dividend of £11,154. From this they recommended that dividends be paid on the original consolidated and new ordinary stocks at the rate of 5¾ per cent. per annum, on the new ordinary "B" stock at the rate of 5¼ per cent. per annum (all less income-tax), which would absorb £7530, and leave £3624 to be carried to the next account. The increased sale of gas over the corresponding half of last year was 6·48 per cent.; and 693 new consumers had been added. The Workmen's Provident Society had become an Approved Society under the National Insurance Act. The report of the Engineer (Mr. Francis Clark) set forth that 1 mile 998 yards of new main-pipes had been laid, making 70 miles 1324 yards throughout the Company's district. The labour troubles during the past half year had caused the greatest anxiety; the difficulty of getting coal to the works to maintain the stocks in any way with a quantity to give a safety margin becoming apparent as time went on. But notwithstanding all the difficulties, the output of gas was not curtailed; the increased demand being met in a satisfactory manner.

The Chairman (Mr. C. F. Woosnam), in moving the adoption of the report, said they had no coal supplied for a good many weeks; but fortunately they had a fair stock of oil and a large stock of coal when the strike broke out. As it was, they were very anxious at one time, as their coal stock was reduced to something like 150 tons. At the height of the season they were carbonizing 100 tons a day; so that would be one-and-a half days' supply. But the Engineer fell back upon his stock of broken coke and tar, and he carbonized from that to a large extent. This mixture—"Clark's mixture" he should call it—was a great help to them at the time. They had now something like 2000 tons in store, and were pushing their contractors to get in more coal. Until they got a stock of something like 5000 tons, they would not be feeling quite safe. The probability was that when their present contracts expired they would have to pay more for coal than at the present time. The oil people had put the price up from 2⅝d. to 3⅜d. per gallon; and with this figure it answered their purpose a good deal better to carbonize coal, from which they secured a large amount of residuals. The report told them that they added 693 consumers during the half year, bringing the total up to 15,000 odd. Cooking-stoves and slot-meters were still in great demand, and showed considerable increases. They had at the present time no less than 10,406, which was not bad out of 15,000 consumers. It would be seen from the capital account that they had raised £15,000 of "B" stock. This stock was oversubscribed, and realized an average of £111 16s. 4d. per £100. The prices ranged from £115 to £110. As to the accounts, the total expenditure under revenue was £33,441, or £441 more than in the previous year; but for this small increase in expenditure they had made and sold 11½ million cubic feet more gas. The balance of £9729 carried to profit and loss account was £637 better than last year. He was very satisfied with the balance-sheet, and anticipated that at the end of the current half year they would have an even better one.

The resolution was seconded by Mr. James Randall, the Deputy-Chairman, and carried. The dividends recommended were then declared, on the proposition of Mr. J. H. Burrows, who in the course of his remarks referred to the Workmen's Provident Society. He said they were going to pay, instead of 10s. a week as under the National Insurance Act, 16s. a week to the sick person for the first 26 weeks; then 8s. a week for a further 26 weeks; and after that there would be 5s. a week disablement benefit. There would be no "waiting period;" the sick person would be entitled to sick pay from the date of certification. The proprietors were going to continue to give to their men, through the Society, the same contribution as they gave previously—20 per cent. of the men's contributions. They were acting on the basis of past experience.

WOLVERHAMPTON GAS COMPANY.

The accounts of this Company for the six months ended the 30th of June last, which were presented to the proprietors, with the report of the Directors, at the half-yearly meeting last Tuesday, showed a net profit of £12,968. In moving the adoption of the report, the Chairman (Major B. O. Clark) said the Company had had a very successful six months' working, and they had a good margin for different expenses which they would have to incur this year. Coal would cost them some thousands of pounds more than last year. The coal strike, to a certain extent, did them some harm. At the same time, he must say that it did them good, because people with cooking-stoves used gas instead of buying coal; and this, of course, was very fortunate for the Company. He thought it was due from him to thank their Manager and the staff for having carried them through in so successful a manner. They had a certain stock of coal at the works; and by economizing to the best of the Manager's power they came out very well indeed, and had some thousands of tons to the good when the strike was over. A vote of thanks was due to the staff for having kept the town lighted. Everything had gone on satisfactorily; and the balance was higher than it was this time last year. The report was adopted; and dividends at the rate of 3 per cent. upon the preference stock, £5 2s. 6d. per cent. upon the consolidated stock, and £3 2s. 6d. per cent. on the new ordinary stock, less income-tax, were declared. Replying to the expressions of thanks to himself and the staff, the Manager (Mr. P. G. Winstanley) said it had been a great pleasure to them to work the concern during the past half year, despite the difficulties which presented themselves. They were backed up by officials at the works, and by every man in the place; and they came through the strike with something like 4000 tons of coal to the good. They had rather more stock now than they had last Christmas; and they expected to increase it to such an extent that they would be beyond all anxiety in the future.

PUBLIC LIGHTING OF NEWMARKET.

Gas v. Electricity.

The question as to which of the above-named illuminants is to be employed in the future public lighting of Newmarket has of late been under the consideration of the Town Committee of the Urban District Council. Tenders have been submitted by the Gas and Electric Light Companies, and particulars from them were laid before the Council at a recent meeting. The Gas Company's tender, based on the existing lamps, was: For five years, £1075; for seven years, £1025; and for ten years, £975—extra lamps to be charged for in proportion. The Electric Light Company sent two tenders, based on a period of ten years—one at £870 2s. 6d., and the other at £979 12s. In submitting their tender, they stated that, in view of the fact that they would have to provide cables, lamp-posts, lanterns, &c., which would entail large capital expenditure, it would be impossible for them to tender for less than ten years, so as to allow them to recoup themselves to some extent the expenditure that would necessarily be incurred.

The Chairman of the Town Committee (Mr. H. Hambling) reported that they had carefully examined the tenders. He also stated that the Electric Light Company had sent a letter to them containing a statement of tests said to have been made by Mr. Haydn D. Harrison, a lighting expert, on the 22nd of July last, of the lighting power of certain lamps in the district. The Committee deemed it advisable to defer the consideration of the tenders. He was about to read the statement, when Mr. Holland asked if the gentleman named had been appointed by the Council; and the Chairman (Mr. R Compodonico) replied that he had not. "Then," said Mr. Holland, "we have no right to listen to anything he might say. If we are to have an expert's opinion, let us appoint one of our own. It looks to me like one tradesman reporting on the goods of another tradesman, and that was not fair." Mr. Ellis moved that the matter be referred back to the Committee, and that no notice whatever be taken of the expert's opinion. Mr. Townsend seconded the motion. He said the night on which the expert took his tests was not a clear one, as he had stated, but one of the worst in July. Mr. Rodrigo characterized the whole thing as "an underhand piece of business;" and Mr. Ellis's motion was carried.

The Committee subsequently instructed the Clerk to the Council to

write to the Electric Light Company and ask them, first, whether, in the event of their tender being accepted, the charges for electric lighting to private consumers would be decreased, and, if so, by what amount; secondly, whether the Company were prepared to erect three temporary 300-candle power electric lamps in the High Street, in order that the light might be compared with the existing gas-lamps; and, thirdly, what was the actual candle power of the electric arc lamps in the Avenue. The Committee also instructed the Clerk to write to the Gas Company and ask them what would be the amount of the increase in the price of gas to consumers under the sliding-scale in the event of the Company ceasing to light the streets of the town.

At the meeting of the Council on Monday last week, the Clerk read the replies of the two Companies.

The Secretary of the Electric Light Company, in answer to the first question, pointed out that it was in the interest of the Company to reduce their price wherever circumstances permitted; but as the estimate of profit was so low on the outlay for street lighting, they were not in a position to definitely promise a reduction. With regard to the illuminating power of the arc lamps in the Avenue, they estimated it at 400 candles; but they had no special test figures to confirm this. They were, however, of opinion that the new lamps of 300-candle power proposed for the High Street would be considered more effective. The Secretary added that the Company would have much pleasure in erecting three standards complete in suitable positions in the High Street, 300-candle power each, at their own expense, to enable the Council to compare them with the light from the existing gas-lamps.

The Secretary of the Gas Company (Mr. J. H. Troughton) replied that, at present, he could not state precisely what would be the increased cost to the gas consumers of Newmarket in the event of the Company's tender for the public lighting not being accepted; but he estimated that the price of gas would have to be increased by 3½d. per 1000 cubic feet. Mr. Troughton explained the working of the standard price and the sliding-scale, and pointed out that under these the gas consumers are, in effect, "co-operators who use the shareholders' capital on terms fixed by Parliament." Having given particulars of the improvements he purposed making in the lighting arrangements of the town, he said: "I notice that the Electric Light Company have quoted for a less candle power than you specify—viz., for 20,590 candles—for a sum of £870 2s. 6d., as well as for what you did ask for—viz., 28,940 candles—for which they tender at £979 12s.; being £4 12s. above our tender. Their price for 20,590 candles is £42 10s. per 1000-candle power, and for 28,940 £33 15s. per 1000-candle power. My Company would be prepared to quote you a much lower price than £42 10s. per 1000-candle power for the smaller quantity; and we would guarantee the light. We would be glad to submit a tender, if your Council are entertaining the idea of accepting a smaller light. In the event of the Gas Company's tender being accepted, we should put in the new fittings and lamps at once, so that for the next twelve months the Council will be getting for nothing a considerable amount of light beyond what they have contracted for."

The Chairman of the Committee suggested that, as both Companies had replied, their letters should be referred to the Committee. After a few remarks, this was done.

FATALITY AT THE MOSSLEY GAS-WORKS.

Explosion in a Gasholder.

While a number of men, employed by Messrs. Ashmore, Benson, Pease, and Co., of Stockton-on-Tees, were engaged last Thursday in the repair of a gasholder at the Roaches Gas-Works of the Mossley Corporation, an explosion occurred which resulted in one workman being killed, and serious injury caused to two others, who had to be removed to the Ashton Infirmary for treatment. For some time past alterations have been in progress; and when the accident happened, three men were at work inside the holder, which is 100 feet in diameter, and has a capacity of 400,000 cubic feet. For the purpose of the operations, the holder had been emptied and inflated with air to a height of about 6 or 7 feet; the escape of air being prevented by a box bolted to the top of the holder. The workmen entered this box, and then passed into the holder through the manhole, and descended to a raft floating on the water in the tank. Work had only just been resumed after the dinner interval when there was a loud explosion inside the holder, which was shot upwards for some distance, and then began to descend. John Wright, a holder-up, and Thomas Bransby, a riveter, who had not descended to the raft, were got out through the air-box; but unfortunately the third man, named Joseph Simpson, was evidently killed at once, and his body imprisoned in the collapsed holder. The two men were badly burned about the face, hands, and legs, and were at once treated with the requisite oils which are kept on the premises; and medical assistance was sent for. In the meantime, Mr. James Taylor (the Gas Engineer and Manager) had reached the holder, and gave directions for the relief, if possible, of Simpson. He had plates removed from the top of the holder; but though the raft was found, no trace of Simpson could be seen. Pumps were set to work to drain away the water; but up to nine o'clock on Thursday night, the body had not been recovered.

Mr. John Bird, the foreman of the gang, had an exciting experience. He was on the top of the holder at the time of the explosion, and had considerable difficulty in retaining his balance as the structure lifted and then suddenly dropped. "I ascended the roof of the holder after dinner," he said, "and my three mates went to work inside. Almost immediately I got on to the top there was a loud report, and the crown was raised several feet; then it began to descend. When I got off, I at once made a search for the men, and found Wright and Bransby trying to get out of the air-box. They were in a dazed condition, and I helped them into the open. I then set about to find Simpson, but was not successful."

Mr. Taylor expressed the opinion that the explosion was due to gas that had got into the holder; but how it had done so had not been determined. Simpson being the first man to reach the raft, would, as was customary, strike a match to light a candle. This was followed by an explosion, which lifted the crown of the holder some 20 feet. The Mossley gas-works have been remarkably free from accidents from the date of their inauguration; and it is 25 years since a fatality was recorded there.

Simpson's body was recovered on Saturday; and from its appearance the doctors believe he must have been killed instantly. He was about thirty years of age, and a married man, with two children.

Since the foregoing was written, we learn that Bransby died in the Infirmary about midnight on Saturday; and that the other injured man (Wright) was then lying in a serious condition.

GAS SUPPLY IN GERMAN TOWNS.

Reports for the Past Year.

Reports have lately come to hand respecting the supply of gas in certain German towns; and the following particulars of interest to English readers have been extracted therefrom.

Hamburg.

The output of gas in the year 1911 from the Corporation gas-works amounted to 108,587,000 cubic metres (3,834,750,000 cubic feet), which is an increase of 6·16 per cent. on the output for 1910. The production was distributed among the three manufacturing stations as follows: Grasbrook, 33 per cent.; Barmbeck, 40·4 per cent.; and Tiefstack, 26·6 per cent. The two last-named works have practically reached the limit of their productive capacity; but Grasbrook has still a good deal in hand. The water-gas plant at the Barmbeck works was kept in operation during the winter months with the object of taking up the fluctuations in the demand for gas, so that the coal-gas plant might be kept in action uniformly. The production of carburetted water gas was equivalent to 10·9 per cent. of the total output of gas made at the Barmbeck works.

The maximum consumption of gas in one day was 497,800 cubic metres (17,579,810 cubic feet) on Dec. 22 last. The gas consumed for public lighting amounted to nearly 14 per cent. of the total output. Six years ago, the change was made from differential prices to a uniform price for gas for all uses. Hence it is no longer possible to distinguish between the gas consumption for lighting and that for heating and other purposes; but it is certain that the increase has been mainly in the use of gas for cooking, and in the sales through prepayment meters. The price of gas has remained unchanged at 4s. per 1000 cubic feet for the past six years.

Hof.

The recently-issued report of the Corporation gas-works of Hof, in Bavaria, refers to the year 1910, for which the output of gas was 2,192,523 cubic metres (77,428,950 cubic feet), which is an increase of 4·20 per cent. on the make of the preceding year. The bulk of the coal carbonized was Westphalian. Of the total output of gas, 22·47 per cent. was sold to private consumers for lighting, and 38·68 per cent. for heating and cooking, while further 9·53 per cent. was disposed of through prepayment meters. The price of gas for heating, cooking, and power purposes was raised in the course of the year from 3s. 5d. to 3s. 8d. per 1000 cubic feet. The average gross calorific power of the gas distributed was 593 B.Th.U. per cubic foot. The year's working realized a net profit (including about £4200 balance carried forward from the previous year) of £8702, out of which about £2000 has been taken for the relief of rates.

Leipzig.

The output of gas from the three Corporation gas-works of Leipzig in 1911 was 49,488,870 cubic metres (1,747,699,450 cubic feet), which is an increase of 6·8 per cent. on the make for the preceding year. Slightly lower prices—*i.e.*, averaging 20s. 4d. per ton free on the works' sidings—were paid for coal than the previous year. Of the coal carbonized, 36·76 per cent. was from Saxony, 48·05 per cent. from Upper Silesia, 5·85 per cent. from Lower Silesia, 7·26 per cent. from Westphalia, and 2·08 per cent. from England. Of the total production of gas, the No. I. works contributed 45·97 per cent., the No. II. works 48 82 per cent., and the Lindenau works 5·21 per cent. The carbonizing plant comprises 106 beds of horizontal retorts and eight settings of large carbonizing chambers. The average charge of one of these chambers is about 105 cwt. 40 lbs. The average make of gas per ton of coal was 10,639 cubic feet in the retorts and 11,751 cubic feet in the large chambers. The coke consumed in heating the retorts and chambers amounted to 15 per cent. by weight of the coal carbonized. The tar produced averaged 5 05 per cent. of the weight of coal.

The output of gas was allocated as follows: Sold to private consumers at the full price for lighting, 47·7 per cent.; at a reduced price for heating and power, 35·9 per cent.; supplied for public street lighting, 7·4 per cent.; for public buildings, 4 2 per cent.; sold through prepayment meters, 0·2 per cent.; consumed on works, 1·5 per cent.; unaccounted for, 3·1 per cent. Tests of the gas in the town showed that it gave on the average a light of 16·1 English candles when consumed in the (Elster) argand burner at the rate of 5·3 cubic feet per hour. The specific gravity of the gas averaged ·439; its gross calorific power, 565 B.Th.U. per cubic foot.; and its net calorific power, 505 B.Th U. The number of gas-burners in use in public lighting was 24,501; and the number of consumers' meters was 96,700, of which 1000 were prepayment meters. The accounts of the undertaking show a surplus realized for the year's working, after interest, redemption and depreciation charges have been met, of about £70,177.

Marienburg.

The gas-works of Marienburg, in West Prussia, produced during the year 1911-12, 1,445,770 cubic metres (51,057,370 cubic feet) of gas—an increase of 9·3 per cent. on the production for the preceding year. Upwards of three-fourths of the coal carbonized was English. The make of gas per ton of coal in 3-metre (about 10 feet) horizontal retorts averaged 11,411 cubic feet. The coke consumed as fuel in the retort-settings amounted to 17·7 per cent. by weight of the coal carbonized. The gross calorific power of the gas averaged 627 B.Th.U. per cubic foot at 60° Fahr., 30 inches of the barometer, and saturated. The

price charged for gas supplied for lighting was 4s. 6d. per 1000 cubic feet, and for cooking, heating, and power purposes 3s. 5d. The gas distributed was allocated as follows: For lighting, 43·7 per cent.; through prepayment meters, 0·4 per cent.; for cooking and heating, 29·8 per cent.; gas-engines, 10·6 per cent.; public lighting, 10·4 per cent.; works' use, 1·2 per cent.; unaccounted for, 3·9 per cent.

Plauen.

The production of gas at the Corporation gas-works of Plauen, in Saxony, in 1911 was 11,863,100 cubic metres (418,945,380 cubic feet), which is an increase of 8·92 per cent. on the make for 1910. Some of this increase is attributed to the expansion of the volume of gas while in the holders owing to the excessive summer heat. Of the gas supplied, 20·1 per cent. was water gas, in the manufacture of which 37·8 lbs. of coke were consumed in the generator, and 16·9 oz. of benzol for carburetting, per 1000 cubic feet of gas made. A Strache "Autolysator" was used for controlling the proportion of carbonic acid in the water gas; the limit worked to being 3·5 per cent. Stoking machinery and electric coke-handling plant were brought into use at the No. I. works during the year, and considerable extensions of the No. II. works were decided upon, to meet the growing demands for gas.

The greater part of the coal carbonized was from the Zwickau district of Saxony. The make of gas per ton of coal averaged 10,808 cubic feet. The gas disposed of was allocated as follows: Private consumers, ordinary meters 73·00 per cent.; prepayment meters, 17·66 per cent.; public lighting, 8·80 per cent.; works consumption, 0·71 per cent. These figures show 0·17 per cent. over-accounted for. The gas had a mean net calorific power of 544 B.Th.U. per cubic foot, and gave on the average a light of 13·8 English candles when consumed in the (Elster) standard argand burner at the rate of 5·3 cubic feet per hour. The coke consumed as fuel in heating the retorts averaged 15·86 per cent. by weight of the coal carbonized. The year's working showed a net profit of nearly £30,000, of which one-third was placed to the reserve fund, and two-thirds was made over to the municipal chest.

SOUTH STAFFORDSHIRE WATER-WORKS COMPANY.

Effect of the Coal Strike—Additional Capital Authorized.

In moving, at the meeting last Thursday, the adoption of the report of the Directors of this Company for the half year ended the 30th of June, noticed in the "JOURNAL" for the 27th ult. (p. 581), the Chairman, Sir Gilbert H. Claughton, who presided in the absence of Alderman Beale, through illness, said it would be useless to take up the shareholders' time with any detailed criticism or explanation, because the Company, like every other, had been put to the greatest possible inconvenience by the coal strike, which had interfered with all comparison of accounts for the half year. The number of houses laid on during the six months had been only 555, which was the lowest number of any half year during the past ten years. It was a disagreeable fact, but they still looked forward to the time when the activity of trade would again lead to the normal increase. The receipts had kept up; in fact, there was a slight rise, upon which they could congratulate themselves, inasmuch as though the domestic supply increased, the works and the railway supplies were naturally very much curtailed during the six weeks of the strike. So far as the capital account was concerned, they had spent £14,947, nearly all of it at Maple Brook, and the shareholders would be pleased to know that this work was satisfactory in all respects. The Directors knew they had water there; and they looked to it to give a very satisfactory increase to their supply. The transfer of Quinton to Birmingham had been effected on fair lines; but it would entail the Company going to Parliament. This they intended to do at the earliest opportunity; and they would, with the leave of the shareholders, incorporate in the Bill two sites which they might require for future extensions. In the accounts, maintenance was up and engine charges were up, for the reason he had mentioned. On the other side of the account, the rates showed a small increase of £114, the profit on services also a small increase, as did the rents; so that, on the whole, the shareholders would be pleased to realize that, notwithstanding what might be described as the catastrophe of last year, they not only maintained their dividend, but carried forward a sum only £728 less than in December. He ventured to think this showed the stability of the Company; and they knew no reason why they should not look forward to a progressive growth, and at any rate to more than holding their own in the future. The motion was carried; and it was resolved to pay a dividend at the rate of 6½ per cent. per annum on the ordinary stock, as recommended by the Directors.

At the close of the general business, a special meeting was held, at which the Directors were empowered to create further capital to the amount of £100,000 (including premiums), being the balance remaining of the £300,000 (including premiums) authorized by the South Staffordshire Water-Works Order, 1901; and also to create debenture stock to the amount the Company are authorized to borrow on mortgage in respect of the additional capital raised under that Order.

STORAGE RESERVOIRS FOR THAMES WATER.

Mr. Hennell's Reply to Mr. Hunter.

In a letter in the Engineering Supplement to "The Times" last Wednesday, Mr. Thomas Hennell replied to Mr. Walter Hunter, whose letter on the subject of the proposed gravitation reservoirs in the Loddon Valley was noticed last week. In the course of it he says:

I am quite aware that the Royal Commissioners in 1892 were shown and reported on the plans of Professor Henry Robinson and Messrs. Marten and Rofe. But they were not, as the report and evidence

Manchester

THE combined population of Manchester and Liverpool is over 1½ million people. During the winter of 1911-12 both the Liverpool United Gas Co. and the Corporation of Manchester Gas Department decided to hire out Gas-fires to their consumers.

After exhaustive tests and careful examination of the design, construction, and general usefulness of various manufactures, they decided to

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show, altogether satisfied as to the feasibility of either of these schemes. At a later stage, they were shown the plan of Messrs. Hunter and Fraser, which was, of course, entirely feasible.

In the case of the Llandaff Commission in 1898, the Order of Reference was restricted to certain subjects; and the President of the Commission at their first sitting made an announcement to the effect that it was not their intention to go into any matter which had been reported upon by the former Commission. They afterwards, however, I believe, found it, in fairness to all parties, impossible so to restrict their inquiry. They did not, in fact, go into the whole question of future supply. But the announcement I refer to no doubt interfered with the production of plans which might otherwise have been put before them.

I cannot help thinking it is to be regretted that the Balfour Commission not only did not investigate, but in their report never mentioned, the existence of other plans; the result being that the entire question of future supply was for a long time treated as one between Wales and Staines only.

I think Mr. Hunter is under a wrong impression when he says that the able Chief Engineer of the Water Board made a complete survey of the Loddon Valley. He never, to my knowledge, made any such survey at all. Mr. Bryan had seen my plan, and mentioned it with others in a report to the Board in 1906. But he then recommended for further investigation another scheme for storage in the valley of the River Enborne, a tributary of the Kennet, many miles west of the Loddon; and for this a very complete survey was made, which occupied many months. I think this must have been the survey that Mr. Hunter had in mind.

I quite appreciate Mr. Hunter's argument as to the desirability of works which can be carried out by instalments according to population and requirements. For this reason the system which he initiated has great advantages over a supply from Wales or any other distant source, which must necessarily involve great initial expenditure. But this question hardly arises when comparing systems of storage by gravitation, or by pumping within moderate distance from the area of supply; for the instalment method can be applied to either of these. The storage which I suggest could, if desired, be carried out in five successive instalments of 3000 million gallons each. In that case, the first three would be taken from the Loddon and the other two from the Kennet. But it would probably be better that the first instalment should provide 6000 millions, with power to extend. There would then be, from the first, appreciable relief to floods on the river.

The "Central News" says: "The St. Petersburg city authorities recently invited tenders for the construction of a purifying station, costing about ten million roubles, to deal with the whole of the water supply of the capital, amounting to 60 million gallons daily. Among the tenders received was one from a British firm offering to undertake the whole of the work, and give all the guarantees asked for, at a price less by three million roubles than the next lowest tender."

NOTES FROM SCOTLAND.

From Our Own Correspondents.

Saturday.

Aberdeen.—Mr. John T. Sorley, the Gas Treasurer, has issued the accounts in connection with the Aberdeen Corporation Gas-Works for the year from July 31, 1911, to July 31, 1912. The revenue account shows that, after charging £11,005 to the sinking fund for the redemption of mortgages and gas annuities, and carrying £3000 to the renewal fund and £300 to the fire insurance fund, there is a credit balance on that account for the year of £4677, which, added to the sum in hand at the beginning of the year, makes a total of £12,453 to be carried forward to the credit of next year's account. The net liabilities in connection with the undertaking at July 31, 1912, amounted to £117,006. This sum was made up as follows: Amount of borrowed money, accounts due to tradesmen, &c., less gas accounts payable, and value of stock in hand, £9043; gas annuities held by the public, as valued in 1897 at £155,659, which at the present market price are valued at £107,963. The total of the capital account is £457,537. The decrease in the value of meters is £1132, and in the value of stoves £858. In the revenue account, which amounts to £125,490, under gas and meter rents ordinary consumers contributed £64,843, motive power £5976, and prepayment meters £16,014. The residual products realized £31,297. In the expenditure account, the manufacture of gas cost £76,753; the sum expended for coal being £50,957. Distribution of gas cost £4989; and rents, feu-duties, and taxes, £6308. The total expenditure is £99,456, and the balance which was carried to the net revenue account is £26,034. The number of cubic feet of gas made was 844,795,000, compared with 817,734,000 cubic feet last year. The estimates of the Aberdeen Water Department were before the Water Committee of the Town Council on Monday. The calculated expenditure for the ensuing year was put at £39,353. At a meeting of the Gas Committee of the Aberdeen Town Council on Wednesday afternoon, it was intimated that prepayment consumers are to receive 33 cubic feet of gas for 1d., in place of 29 cubic feet as now. The price to ordinary and power consumers is to remain as before. The accounts for the past year and the estimates for this year were approved.

Aberlour.—The new holder at the gas works has now been completed, and was formally opened a few days ago by Bailie Garrow. A cake and wine banquet followed, when a short toast-list was submitted by Provost Morrison, Bailie Raffan, and Councillor M'Gowan.

Dundee.—The completion of the scheme for the raising of the level of Lintrathen Loch, from which Dundee obtains its water supply, was reported at a meeting of the Water Committee of the Town Council on Tuesday. The estimated cost of raising the level of the loch 4 feet was £15,000, but the actual cost had been £12,481—being £2519 under the Water Engineer's estimate. The construction of a new road had cost £1248, and miscellaneous expenses £900. The Dundee Gas Committee have authorized Convener High to make arrangements for the enter-

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tainment of any of the members of the Engineering Section of the British Association who may want to visit the gas-works during their stay in the city.

Forfar.—Last Wednesday was Budget night in the Forfar Town Council, and Councillor Lamb submitted the accounts of the gas undertaking for the year. He said they started the current year with practically £400—£334 of last year's surplus of £734 having to be written off for depreciation. On the whole, the year had been very satisfactory, so much so that the Committee felt justified in recommending a reduction of 3d. per 1000 cubic feet in the price of gas; making it 2s. 8d. all over Forfar. This charge would produce £5866, which with £3422 of the other revenue would exceed the estimated expenditure by £295. By reducing the price, they could not devote anything to depreciation next year; but it was not considered necessary to do so. He had gone over the accounts with the Manager (Mr. James Dickson), who, he thought, should be complimented on obtaining such good results. He moved the adoption of the estimates, Provost Moffat, in seconding the motion, said he thought the Council should congratulate themselves that the gas undertaking had done so exceedingly well since Mr. Dickson took the management. It testified to the excellence of his methods that 3d. should at this time be taken off the price of gas, which would help the ratepayers to meet the increase of 7½d. in the pound in the assessments. The estimates were passed unanimously. The new prices of gas are 2s. 8d. for ordinary and 2s. 5d. for power consumers—both less 5 per cent. discount—slot-meter consumers paying 3s. 1d. It should be explained that the depreciation fund referred to by the Convener was instituted two years ago as an additional reserve fund over and above a contingent fund towards which 2½ per cent. of the gross revenue is contributed. The first-named fund is not a statutory one; and the amount now standing to its credit is considered ample.

Kirkcaldy.—There was issued on Friday a report by Mr. J. Kincaid, the Manager of the Kirkcaldy Gas-Works, dealing with extensions, due to want of storage facilities for coke and defects in the plant of the present works. Mr. Kincaid's scheme includes the demolition of No. 1 retort-house and a portion of the coal-stores, and the erection of a 1,000,000 cubic feet per day retort-house, either for verticals or machine-charged horizontals. New coal-stores, capable of holding 2000 tons of coal, besides a considerable space for storing in the open, are provided for. In the cost are included additional water-cooled condensers of 1,500,000 cubic feet capacity, and a washer of 1,500,000 cubic feet per day capacity to take the place of the existing deficient washing plant. The scheme, with an additional gasholder of 500,000 cubic feet on new land, would cost altogether £46,800. This sum, at 6 per cent. to meet interest and sinking fund, would represent an annual charge against the undertaking of £2800. Against this the annual saving which would be effected is estimated at £4258. In connection with the winding-up of the Kirkcaldy Gas Company, it was resolved at the last meeting of the shareholders to remit the Liquidator's accounts for examination to a Committee appointed by the shareholders. The Committee have now issued their report, showing that the price of the whole arbitration proceedings in connection with the taking over of the undertaking by the Kirkcaldy Corporation amounted to £137,150. For the purpose of comparison, the Committee made inquiries regarding the cost of the proceedings when the gas-works at Falkirk and Dunfermline were taken over, which showed that the price of the Dunfermline works totalled £94,000, and Falkirk £77,050 (stock, &c., paid for in addition). Exception is taken by the Committee to the law accounts, the commutation of Mr. M'Pherson's pension, extra remuneration to the Directors, and the Liquidator's fee of £1050; and they add that they are anxious, if possible, to arrive at some amicable understanding with regard to these matters, so that they can recommend their acceptance to the shareholders. The Liquidator, however, replied that he was prepared to "defend the payments" to Mr. M'Pherson and to the Directors, and that he was still willing to refer the question of his remuneration as Liquidator to the Auditor of the Court of Session, and that the law accounts "should be taxed in the ordinary manner." In view of the fact that the Liquidator had declined to discuss or agree to any satisfactory solution of the points referred to in the report, the Committee, looking to the large issues involved, had no alternative but to recommend the shareholders to give instructions for obtaining a legal decision on the points at issue.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Aug.* 31.

Sulphate of Ammonia.

Although the tone of the market has become somewhat quieter during the past week, there has been no sign of weakness in any position, while in some instances a still further increase in values has been recorded. Stocks are apparently in moderate compass, and the present output is only sufficient to meet current demand. At the close, the quotations are £14 10s. per ton f.o.b. Hull, £14 12s. 6d. per ton f.o.b. Liverpool, and £14 13s. 9d. per ton f.o.b. Leith. With regard to future delivery, it is reported that £14 12s. 6d. per ton f.o.b. Hull for September-December, and £14 15s. per ton f.o.b. Liverpool for October-March, in equal monthly quantities, have been paid. For Leith shipments, producers are now asking £14 17s. 6d. per ton over January-June, 1913; but no business has transpired at this figure.

Nitrate of Soda.

There is no quotable change in this material, holders remaining very firm at 11s. 4½d. per cwt. for ordinary and 11s. 6d. for refined quality on spot.

LONDON, *Sept.* 2.

Tar Products.

There is little alteration in the markets for tar products, and on the whole prices remain firm. It is still difficult to do business in

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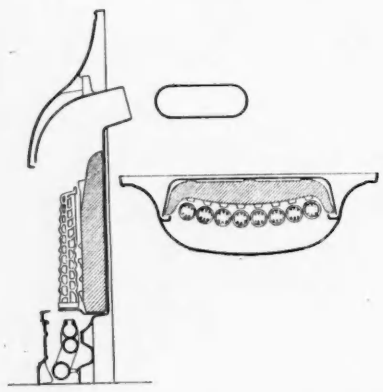

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(See "JOURNAL" article, July 30th. Reprints on application.)

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pitch; but one or two sales have been reported at the equivalent of to-day's values. Ninety per cent. benzol is very firm, and the inquiry is good for both prompt and forward delivery. In fifty per cent. benzol, the price remains good, though there is not very much fresh inquiry. Solvent naphthas are steady, and maintain their prices. Crude carbolic is without alteration. Creosote is very firm, and the inquiry is regular. Further sales are reported at the equivalents of to-day's quotations.

The average values during the week were: Tar, 29s. 6d. to 33s. 6d. *ex* works. Pitch, London, 51s. to 52s.; east coast, 51s. to 52s.; west coast, Clyde 52s. 6d. to 54s. 6d., Manchester 50s. 6d. to 51s. 6d., Liverpool 51s. 6d. to 52s. 6d. Benzol, 90 per cent., naked, London, 1s. 1d. to 1s. 2d.; North, 1s. to 1s. 1d.; 50-90 per cent., naked, London and North, 10½d. to 11½d.; Toluol, naked, London, 11½d. to 1s.; North, 11d. to 11⅛d. Crude naphtha, in bulk, London, 5½d. to 6d.; North, 5d. to 5⅛d. Solvent naphtha, naked, London, 1s. 1½d. to 1s. 2d. f.o.b.; North, 1s. 1d. to 1s. 2d. f.o.b. Heavy naphtha, naked, London, 11½d. to 1s. 0¼d. f.o.b.; North, 10d. to 10¼d. f.o.b. Creosote, in bulk, London, 3d. to 3¼d.; North, 2¾d. to 2⅞d. salty, 3⅛d. to 3¼d. liquid. Heavy oils, in bulk, 3¼d. to 3⅜d. Carbolic acid, casks included, 60 per cent., east coast, 2s. 6½d. to 2s. 7½d.; west coast, 2s. 5½d. to 2s. 6½d. Naphthalene, £4 10s. to £9 10s.; salts, 45s. to 55s., bags included. Anthracene, "A" quality, 1½d. to 2d. per unit, packages included and delivered.

Sulphate of Ammonia.

There has been a continued inquiry for this article during the past week; and in one or two ports improved prices have been paid. Actual Beckton is quoted at £14 2s. 6d. Outside London makes are £13 17s. 6d.; Hull, £14 8s. 9d.; Liverpool, £14 11s. 3d.; Leith, £14 12s. 6d. to £14 15s. Middlesbrough, £14 8s. 9d. to £14 10s.

COAL TRADE REPORTS.

Northern Coal Trade.

The coal trade has been kept quiet because of the scarcity of steamers at the coal-shipping ports, which has limited the shipments thence. In the steam coal trade, best Northumbrians are from 13s. 9d. to 14s. 3d. per ton f.o.b.; second-class steams are from 12s. to 12s. 6d.; and steam smalls are 8s. 9d. to 9s. 6d. The production at the collieries is fairly good. In the gas coal trade, the consumption is increasing. Best Durham gas coals are from 12s. 9d. to 13s. per ton f.o.b.; and second-class gas coals are 12s. to 12s. 6d. "Wear specials" are from 13s. 6d. to 14s. per ton. For prompt delivery, the prices are rather easy; but for forward sales, the values are well held by the collieries. There are no large contracts reported in the last few days; but some forward sales of moderate quantities are at near the current prices. The coke trade is very firm. Though gas coke is now in larger production, the prices are higher; and good makes are quoted at 20s. to 21s. per ton f.o.b. in the River Tyne.

Scotch Coal Trade.

During the week, the coal trade has been very active, and the demand for shipment coal has been well maintained, though tonnage has been scarce. On Friday, the f.o.b. prices on the Glasgow Coal Exchange were: Ell coal, 12s. to 13s., according to quality; splint, 12s. 9d. to 13s.; steam, 11s. 9d. to 12s.

Selling Gas-Mantles on False Pretences.

At the Sutton Petty Sessions, a few days ago, two young men, named Gordon Bussereau and Percy Classing, were charged with being concerned together in attempting to obtain, on the 21st ult., the sum of 1s. 2d. from Esther Walker, by falsely representing themselves to be employees of the Sutton Gas Company. The first-named defendant was further charged with obtaining from Rosina C. Harston the sum of 1s. 1d. by a similar representation. In the first charge, the accused presented themselves at a house in Stanley Road, Sutton, and stated that they had brought certain mantles which had been ordered from the Gas Company. The lady of the house, however, declined to have anything to do with them. In answer to this charge, Bussereau declared that what he said was that he represented the Sutton Gas-Fittings Company. The Chairman (Sir R. C. Forster) remarked that there was no such concern as that. Thereupon the accused said he was the company, and he thought he was doing no harm. In the second case, the prosecutrix stated that the men called at her house, and she understood Bussereau to say that he came from the Gas Company. He showed her a mantle, which he described as a new kind which was being brought out by the Company. After some hesitation, she ordered three mantles, for which she paid 1s. 1d. in advance. Prisoners gave a receipt, which was written by Bussereau; but no mantles had been received. Mr. Percy Smith, the Gas Company's Show-Room Manager, said the prisoners were not in the employ of the Company. The mantles (of which he had seen a sample) were quite worthless, as so soon as they were lit they dropped off. There had been various complaints in the Company's district with regard to the sale of the mantles, which had been going on for some time. Another witness stated that Bussereau represented himself as having come from the Gas Company with mantles to show him. Evidence having been given of the arrest of the two men, in whose possession eleven packets of mantles were found, they both pleaded guilty. Bussereau, however, denied that he desired to do any harm to the Gas Company. A fine of £2 was imposed on each of the accused, or a month's imprisonment in default.

The contract of Messrs. Daniel Eadie and Co., of Stockport, for the construction of a reservoir at Dove Holes, has been accepted by the Chapel-en-le-Frith District Council; the amount being £3972.

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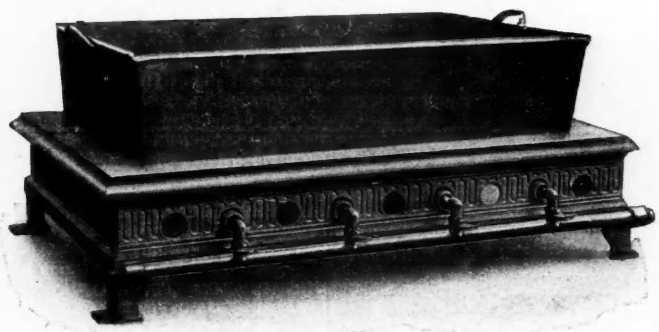

THE "MAIN" Gas-Heated FISH FRYERS.

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Proposed Sale of the Dudley Electrical Undertaking.

Considerable feeling has, says the "Birmingham Mail," been aroused in Dudley by the proposal, emanating from a special committee meeting of the Town Council, to sell the municipal electrical supply works. These were founded in 1899; an arrangement to supply current for the tramway traction being in connection with a scheme under which the reconstructed tramways were, together with the rolling stock, to be purchased by the Corporation and leased to the vendors. The late Alderman G. H. Dunn, the Chairman of the Committee, was after the first couple of years able to show a small net profit; and notwithstanding almost continuous extensions, these profits were regularly made until 1909. Critics were not slow to point out that, in order to show a profit, there was an omission from the balance-sheet of any allowance for depreciation of plant. The Council deemed it wise to place the profits to a reserve fund, which a Local Government inspector compelled them to absorb in the capital expenditure. The 1910 balance-sheet showed a net profit of £123. In the following year, there was an arbitration at the Board of Trade, relative to the price of current charged to the Tramway Company. The Arbitrator took into consideration the large rental which the Tramway Company are paying the Corporation for the lines and rolling stock, and awarded such a reduction that an anticipated profit of £300 in the 1911 balance-sheet was converted into a net loss of £600. Up to the present £2000 has had to be transferred from the district rate fund to the electrical fund, to cover the loss of revenue resulting from this arbitration. The Committee have considered what increased lighting business would be necessary to recoup the loss, and have recommended a further capital expenditure of £30,000. The Council were, however, more disposed to consider an offer which they have received for the purchase of the concern. This will be laid before the September meeting of the Council. Great disappointment is expressed by ratepayers at the turn of events.

Bishop's Stortford, Harlow, and Epping Gas and Electricity Company.—In the report presented at the half-yearly meeting of this Company last Wednesday, the Directors stated that compared with the six months ended the 30th of June, 1911, the sale of gas in the first half of the present year had increased by 2,154,100 cubic feet, or 4·3 per cent. The accounts accompanying the report showed that the revenue was £12,435, and the expenditure £9322; leaving £3113 to go to the profit and loss account. There were 51,325,000 cubic feet of gas sold, producing a net return of £9331. The balance available for distribution (inclusive of the amount brought forward) was £4119; and the Directors recommended the declaration of dividends for the half year at the full statutory rates—viz., £5 14s. and £5 10s. per cent. per annum on the "A" and "B" stocks, and £5 and £4 per cent. per annum in the "C" and "D" preference stocks. These payments would absorb £3070, and leave £1049 to be carried forward. Throughout the prolonged period of the coal strike, a full supply of gas was, at great additional expense, maintained throughout the district.

Sutton (Surrey) Gas Company.

At the recent half-yearly meeting of the Sutton Gas Company, the Directors reported a sum of £7701 available for distribution; and they recommended the payment of a dividend at the rate of 6 per cent. per annum (less income-tax) for the six months ended the 30th of June. The accounts accompanying the report showed that the revenue was £23,314, compared with £22,589 for the first half of 1911, and that the expenditure was £16,211, against £15,965. The quantity of coal carbonized was 10,210 tons; and the gas produced was 122,717,000 cubic feet, or slightly more than 12,000 cubic feet per ton. The Chairman (Mr. F. Budgen), in moving the adoption of the report, said that during the period covered by it the Directors had reduced the price of gas to 2s. 6d. per 1000 cubic feet; and they now proposed to pay an increased dividend of 5s. per cent.—bringing it up to 6 per cent, the full amount they were able to pay under the sliding-scale. The business of the Company had, he thought, increased in every way—the consumers by 150, making the total 6350; the cookers by a like number; the returns from residuals by 16 per cent.; and the gas sold by 6 per cent. The report was adopted, and the dividend recommended agreed to. Mr. Benwell proposed a vote of thanks to the Directors and officers; saying he thought the accounts presented were a guarantee that every attention had been paid to the work of the Company. The motion having been carried unanimously, the Chairman, in returning thanks, said the Directors spared neither time nor themselves in any way in their endeavour to bring the business to a successful issue. As to the staff, the Directors were unquestionably much indebted to them for their good services, and for the knowledge, energy, and perseverance they brought to bear upon the business. The Secretary and Engineer (Mr. G. Mead-Robins) said he should like to associate himself with the reply to the vote of thanks, and to tell the proprietors that the officials and staff did their very utmost for the interests of the Company.

Altrincham Gas Company.—At the half-yearly meeting of this Company last Wednesday, it was stated that the coal strike had caused a loss of between £400 and £500; that the sales of gas showed an increase of about 250,000 cubic feet; and that the balance available for distribution was £11,028. This would provide for the payment of the full statutory dividends, and leave £7374 to be carried forward. The report and balance-sheet were adopted.

Romford Gas Company.—The accounts of this Company for the six months ended the 30th of June showed that the revenue had been £13,239, and the expenditure £9203; leaving £4036 to go to the profit and loss account. The balance available for distribution was £7677; and the Directors recommended the payment of dividends at the rate of 13½ and 10½ per cent. per annum, less income-tax. These would absorb £2883, and leave £4794 to be carried forward. There was an increase of 13·4 per cent. in the sale of gas compared with the first half of last year.

ARDEN HILL'S "LOKA" GAS-FIRE.

THIS NEW SHELF-TOPPED FIRE, with the "OLAK" (Round-topped) and the "KALO" (Square-topped), completes a triad of popular Stoves—The "O.K." Series.

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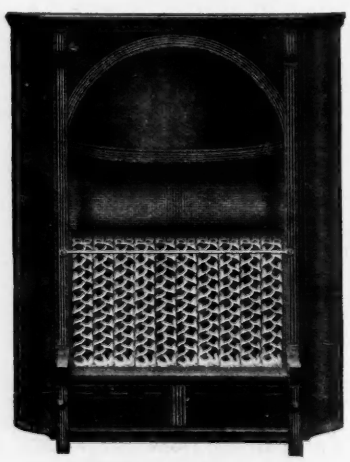

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Tipton District Council Gas Department.

The accounts of this department for the year ended the 31st of March last, prepared by Mr. James E. Rowley, the Auditor, have been issued. They show that the revenue from the sale of gas was £14,582, compared with £13,801 in the preceding year; that the sale of residuals produced £6240, against £5581; and that the total receipts were £20,840, compared with £19,539. The expenditure on the manufacture of gas was £11,645, against £10,928; on distribution, £947, against £801; and on management, £482, against £331—the total expenses being £14,658, compared with £13,611. The balance carried to the profit and loss account is £6182, against £5928 this time last year. Of the former amount, £1949 goes for interest, £2545 to the sinking fund, and £1688 to the accumulated profits account. This sum added to the amount carried forward produced £8365, of which £600 is applied in aid of the district rate, and the balance (£7765) carried forward. Under the supervision of Mr. Sidney O. Stephenson, the Gas Engineer and Manager, 11,956 tons of coal and cannel were carbonized, and the gas made from it was 131,827,000 cubic feet, or 11,026 cubic feet per ton. Of water gas, 6,838,000 cubic feet, or 4·93 per cent. of the total, were added—making altogether 138,665,000 cubic feet, of which 138,556,000 cubic feet were sent out, and 120,626,875 cubic feet sold and used on the works. The leakage was equal to 13 per cent., compared with 13½ per cent. in the year ended March 31, 1911. The residuals produced were: Coke and breeze, 8901 tons; tar, 144,738 gallons; and ammoniacal liquor (10 oz.), 315,854 gallons.

Bettws-y-Coed Water Supply.—At a Local Government Board inquiry by Mr. T. C. Ekin, regarding an application by the Bettws-y-Coed Urban District Council for sanction to borrow £9700 for purposes of water supply, Mr. Artemus Jones (representing the Council) said the scheme provided for the abstraction of water from Elsie Lake, three-quarters of a mile from the village. It was entirely due to the public spirit and generosity of Lord Ancaster, in whom was vested the water rights of the lake, that the Local Authority were prepared with a practical scheme. The Council proposed to buy the quarry now dependent upon the lake, for £2700; and Lord Ancaster undertook to grant a lease for 999 years.

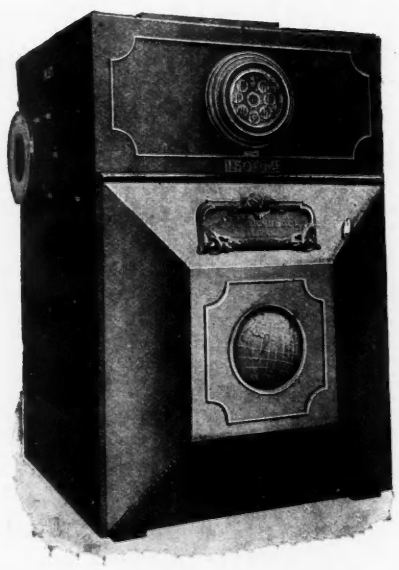
Coal Strike Affects the Price of Gas at Weston-super-Mare.—In the half-yearly report presented at the meeting of the Weston-super-Mare Gas Company last Tuesday, the Directors stated that, though the accounts were satisfactory, it had been found necessary, owing to the miners' strike and the increased cost of coal resulting therefrom, to withdraw the last reduction of 2d. per 1000 cubic feet in the price of gas, and revert to the former figure. The amount available for distribution was £10,596; and the Directors recommended the payment of the maximum dividend at the rate of 5 per cent. per annum on the ordinary stock, less income-tax. They have added £400 to the insurance fund, bringing it up to £2870; and they have also written-down the holding of Consols by £588 18s. 4d.

Watford Gas Company.

Presiding at the half-yearly meeting of the Watford Gas and Coke Company, the Chairman (Mr. E. J. Slinn) said that the Directors could congratulate the shareholders on the increase in the consumption of gas during the past six months. The summer revenue was becoming pretty well equal to that in the winter. There had been an expenditure of £1900 on mains and services, which included the extension to Buck's Hill. They had also taken the mains to Leavesden Green, where they now supplied many consumers; so that the outlay had proved very lucrative. In April, £4000 of additional stock was issued; and it brought in a higher price than ever before. The amount devoted to co-partnership was £246, which was practically the same as the previous year. The men of the permanent staff now held £1320 of the Company's "B" stock. This, he thought, was very good, considering that they had to pay also insurance money and unemployment contributions. He doubted whether the men would have accumulated all this money if it had not been for the co-partnership scheme. On the revenue account there was now a balance of £4566. One reason for the satisfactory figures was that they had had one or two big new customers, and had supplied a good deal of gas in bulk. They had a good working balance, and were able to pay the statutory dividends. The sale of gas had increased by 19 million cubic feet, which was an increase of 18 per cent. The report (which was adopted) stated that, notwithstanding the coal and transport strikes, the Directors were not only able to maintain an uninterrupted supply of gas, but to assist, with coal, other companies in the immediate vicinity. On the proposition of Mr. H. E. Jones, the remuneration of the Board was increased. The General Manager and Secretary (Mr. J. D. Royal), the Works Manager (Mr. T. S. Godwin), and the staff were thanked for their services.

The Newry Gas Explosion.—At a special meeting of the Newry Gas Committee, held to inquire into the gas explosion in Barrack to which reference was made in last week's "JOURNAL" (p. 574), a report was submitted by the Gas Manager (Mr. J. Reilly), who stated that he had come to the conclusion that the explosion was due to the bursting of two joints in the gas-main some hundreds of yards away in Canal Street. The gas, he believed, had travelled underground through an old water-channel, and the ignition was caused by some smoker unthinkingly throwing a lighted match on the roadway. The explosion, happily, was not attended with loss of life or injury to any person. Several members of the Committee expressed surprise that when the main was laid in the first instance the piping used was not new, but material already discarded after doing service in another part of the town; and they were of opinion that this was a mistake on the part of the Gas Committee of that period. In order to guard against the danger of a repetition of the accident, they instructed the Manager to carry out a thorough test of all the mains in the town. Apart from the possibility of another explosion, they believed that this examination would probably save a considerable sum in preventing leakage.

BRADDOCK'S IMPROVED GAS METERS



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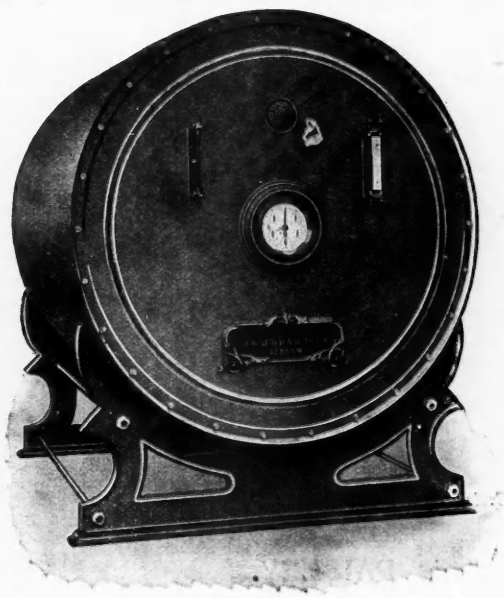

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Cork Gas Consumers' Company.

The report presented at the eighty-seventh ordinary general meeting of the Cork Gas Consumers' Company, which was held on Monday of last week, under the chairmanship of Mr. George Lynch, stated that, as compared with the June half year of 1911, the statement of accounts showed a fair increase in the rental, while the residuals also yielded a good return. After placing £1916 to the depreciation fund, towards meeting anticipated expenditure, there was a balance of £5507, out of which it was proposed to pay a dividend at the rate of 8 per cent. per annum. In moving the adoption of the report, the Chairman referred first to the coal strike, and stated that, by having about two months' supply of coal in store and buying a couple of cargoes at high prices, the Directors were able to avoid a reduction in the supply of gas. There continued to be a steady increase both in the number of consumers, which now exceeded 9900, and in the quantity of gas sold. The advantages of gas for cooking, heating, &c., were being more fully appreciated; and the appliances in use for these purposes now numbered nearly 6000, while the smaller ones—laundry-irons, boiling-burners, and bath-heaters—exceeded 4000. So that everyone might get the satisfaction invariably following the proper use of gas-stoves, the Directors had engaged a highly-qualified instructress, whose services were at the disposal of any consumers who desired advice on the most effective manner of using the appliances they had. The report was adopted, and the dividend recommended declared.

Southport's Prosperous Gas Estate.—Mr. George Lloyd, the Borough Treasurer of Southport, has just issued his annual report. Contrasting the profits returned from the different departments to-day and those ten years ago, he shows that the gas estate yielded in 1901-2 £7923, while for the past financial year the amount was £12,393. Ten years ago, the gross profit on the gas undertaking was £19,409, and the net profit £7923; while last year there was a gross profit of £35,369 and a net profit of £13,400, after allocating £4000 to revenue towards the reconstruction account, in addition to paying interest and sinking fund charges.

Biddulph and Gas-Works Purchase.—The Biddulph Urban District Council have again had before them the question of the purchase of the local gas-works; a report having been submitted by a deputation appointed to discuss the subject with the Directors of the Gas Company. This report stated that a sum of £2500 was suggested on behalf of the Council, while the Company's representatives replied that if an offer of £3000 was made by the Council the Board would consider it, on the understanding that the stock in hand and capital expenditure between the time of signing the contract and the completion of the purchase were paid for by the Council as an extra. The members of the Council once more fully discussed the advisability or otherwise of purchasing the concern; and a resolution to the effect that they should make an offer of £3000 was carried by eight votes to three.

Additional Capital for the Leatherhead Gas and Lighting Company.—It will be seen from an announcement appearing elsewhere that the Leatherhead Company are inviting tenders for 1000 shares of £10 each and £5000 of 4 per cent. debenture stock, to be issued at par as the minimum price. The capital to be raised is a portion of that authorized by the proprietors at the general meeting of the Company on the 7th ult., in pursuance of the powers of the Act of the present session; and it is required to defray the expenses connected with the purchase of the undertaking of the Cobham Company, and to develop that Company's area, as well as meet the increased requirements of the Leatherhead district. During the past seven years, dividends of 5 per cent., free of income-tax, have been paid on the shares; but at the present price of gas (3s. 8d. per 1000 cubic feet), the Company have the right to pay, under the sliding-scale, 7 per cent.

Reduction in Price at Barnsley.—At the annual meeting of the Barnsley Gas Company last Thursday, the Chairman (Mr. E. G. Lancaster) announced a reduction of 2d. per 1000 cubic feet in the price of gas, which, with the 5 per cent discount already allowed, would, he pointed out, bring the figure down to 3s. In moving the adoption of the report and accounts, he said that, in spite of the railway and coal strike troubles, the results of the year's working were better than might have been expected. They had a fair stock of coal on hand during the strike; but later they had to pay from 20s. to 30s. per ton for coal they previously bought at one-third the cost. The result was that they earned £919 less than in the previous year. This reduction was more apparent than real, for they had granted £625 in extra discount to the customers, making the reduced earnings really £294. The Chairman explained that the satisfactory result was due to the installation of the new mechanical stoking plant.

Normanton Gas Company.—It was stated by the Chairman (Mr. J. Armitage) at the half-yearly meeting of the Normanton Gas Company that the working results for the past six months had been very satisfactory, though the gas sold showed a reduction of 688,000 cubic feet. This was the first occasion for many years that they had had to record a reduced consumption; and the falling off was entirely accounted for by the coal strike. The Directors were at present very much concerned with the new assessment of the undertaking, which, to their utter amazement, had been increased by nearly 74 per cent., whereas during the period since the last assessment the increase in the quantity of gas made was only 24 per cent. It was needless to say the Board intended to make every effort to have the matter readjusted on a more satisfactory basis. The report showed that the profits for the half year amounted to £2200, and that, after providing interest on mortgages, there was £3337 for division; and the Directors recommended dividends of 6 per cent. on the original stock and 4½ per cent. on the additional stock, with £250 to the reserve fund. The report having been adopted and the dividends declared, a vote of thanks was passed to the Directors, Secretary and Engineer (Mr. E. H. Hudson), and staff.

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SOLE MAKERS—

Sawer & Purves.

Maryborough (Queensland) Gas Company, Limited.—The profits of this Company for the six months ended the 30th of June amounted to £1066; and after the payment of a dividend of 6 per cent. per annum (free of income-tax), there was a sum of £292 to the good.

Brisbane Gas Company.—The accounts of this Company for the half year ended the 30th of June show a profit of £14,803. A dividend of 6 per cent. has been declared, amounting to £9600, and £480 has been paid; making together £10,080, and leaving £4723 to be carried forward.

York Corporation and the Gas Company's Undertaking.—At a special meeting of the proprietors of the York Gas Company held on Monday last week, it was resolved to approve of the provisional agreement for the sale of the undertaking to the Corporation, as embodied in the Company's new Act of Parliament.

Sale of Ilfracombe Gas Stock.—At the Ilfracombe Gas Company's offices last week, £1000 of consolidated ordinary stock was sold by auction; the lots being quickly disposed of. The stock, which carries a maximum dividend of 5 per cent. was divided into lots of £50 each; and the prices realized were from £54 to £55 per lot.

An Advertisement of Long Ago.—The following is reprinted by the "Observer" from their number dated Sunday, Aug. 30, 1812—

> GAS LIGHT AND COKE COMPANY, 96, Pall Mall.
> Aug. 24, 1812.
>
> THE COURT of DIRECTORS of this COMPANY hereby give notice that the Books of this Company will, on the 1st day of October next, be open at their Office to receive Subscriptions for such Shares in this undertaking as shall then remain unsubscribed for.
>
> J. PEDDER, Secretary.

Winchester Water and Gas Company.—At the meeting of this Company last Thursday, the Directors reported a satisfactory increase in the receipts from the sale of both gas and water in the half year ended the 30th of June. The gas-rental amounted to £9326, the water-rental to £4637; the total revenue being £16,733. The expenditure having been £11,231, there was a balance of £5502 to go to the profit and loss account. The sum available for distribution was £8554; and the Directors recommended the payment of a dividend at the rate of 4¼ per cent. per annum, less income-tax, for the half year, on the Consolidated ordinary stock. The Engineer and General Manager (Mr. H. C. Head, Assoc.M.Inst.C.E.) certified that the whole of the Company's plant had been maintained in a thoroughly efficient condition. Under his supervision, 3641 tons of coal and 13,827 gallons of petroleum spirit were used in the manufacture of gas, of which 51,708,400 cubic feet were sold for public and private lighting. The estimated quantities of residuals produced during the half year were: Coke, 2271 tons; breeze, 770 tons; tar, 32,718 gallons; ammoniacal liquor, 33 tons 2 cwt.

Gradual Abolition of Gas-Meter Rents at Todmorden.—With three dissentients, the Todmorden Town Council have decided that from April 1, 1913, all gas-meter rents shall be reduced one-quarter of the present charge, and also a further quarter every two years until they are abolished. By a further resolution, all private meters will be repaired and maintained by the Corporation until March, 1919, and afterwards they will supply and maintain all meters used by consumers.

Bolton Corporation Gas Coal Contracts.—At their meeting last Friday, the Gas Committee of the Bolton Corporation had again under consideration tenders for the supply of coal and cannel for the year. In the end, it was decided to purchase from 16 firms a total of 74,500 tons; the separate contracts varying from 500 tons up to 8000 and 9000 tons. Two firms' tenders were deferred. Information as to the prices to be paid was not available; the bare statement being made that the matter had been one of considerable anxiety to the Committee, and that the advance all round upon last year's prices was a substantial one.

Grays and Tilbury Gas Company.—At the ordinary half-yearly general meeting of this Company, held last Wednesday, the Chairman (Mr. F. E. Bartlett), in moving the adoption of the report, congratulated the shareholders upon the excellent results of the half-year's working, and drew attention to the very low percentage—viz., 0·81—of gas unaccounted for, which was the lowest recorded by the Company. The quantity of gas sold in the six months ended June 30 showed an increase of 10·2 per cent., compared with the corresponding period of 1911. Dividends at the rate of £8 10s. per cent. per annum on the "A" shares and £5 19s. per cent. per annum on the "B" shares (less income-tax) were declared. A hearty vote of thanks was unanimously passed to the Directors for their services; similar votes being accorded to the Engineer and Manager (Mr. A. W. Sumner) and the Secretary (Mr. W. F. Whittaker) and their staffs.

Cobham Public Lighting Question.—There was much discussion when the Cobham Parish Council had before them for consideration the draft of the proposed agreement between the Council and the Leatherhead Gas Company for the public lighting of the parish. This agreement, it was explained, was practically a copy of the form used by the Epsom Rural District Council in contracts with other gas companies; but the Leatherhead Company found some fault with the penalty clause, which stipulated, among other things, that they should forfeit "the sum of £10 every night on which the whole number of the public lamps shall be out through any failure in the supply of gas or by reason of the neglect or default of the Company, their servants, or agents." The Company pointed out that, under this clause, they would be liable to pay £10 per night even should the main be broken by the Council's steam-roller; and they suggested the deletion of the word "or" after the word "gas" in the phrase "through any failure in the supply of gas or by reason of the neglect or default of the Company." The Council decided to recommend the Epsom Rural District Council to agree to sign the contract in accordance with the terms of the agreement subject to the deletion of the word "or," as suggested by the Company.

GAS FIRE SEASON 1912-13.

THE "ELYSIAN"?

PARKINSON STOVE CO., Ltd.

APPLICATIONS FOR LETTERS PATENT.

18,905.—Clayton, J., and Taylor, R., "Valves or taps." Aug. 19.

18,940.—Honchin, T. J., "Automatic lever control of gas." Aug. 19.

18,998.—Lessing, R., "Hydrogenation of unsaturated substances." Aug. 19.

19,044.—Brown, D. A., "Acetylene generators." Aug. 20.

19,080.—Gaydon, H. A. & H. W., "Exhausters." Aug. 20.

19,097.—Stettiner Chamotte-Fabrik Akt.-Ges. vorm. Didier, "Retort-furnaces or the like having upwardly tapering vertical retorts." Aug. 20.

19,138.—Melmore, W. M., "Compressing gas." Aug. 21.

19,170.—Walker, J. H. & P., "Cocks and taps." Aug. 21.

19,203.—Bryan, A., and Mountfort, L. F., "Controlling valves." Aug. 22.

19,207.—Thompson, W. P., "Gas-lamps." A communication from the General Gaslight Company. Aug. 22.

19,228.—Heinrich, A. B., "Measuring the flow of liquids." Aug. 22.

19,277.—Reis, A., "Pumping or compressing." Aug. 22.

19,329.—Pokorny and Wittekind Maschinenbau Akt.-Ges, "Gas-compressor." Aug. 23.

19,366.—Thau, A., "Pipe-joints." Aug. 23.

19,382.—Johnson, E. H., "Gas-heated hot-water apparatus." Aug. 24.

19,398.—Lees, F. H., "Acetylene generators." Aug. 24.

19,440.—Mitchell, E. A., "Connecting together branch and main pipes." Aug. 24.

Extensions at the Chorley Gas-Works.—The Chorley Town Council have decided to apply to the Local Government Board for a Provisional Order to amend the Chorley Improvement Act, 1871, so that powers may be granted to the Corporation to borrow £48,695—in addition to the moneys authorized under the Act, for the purposes of gas-works extensions. During the past ten years, with no augmentation of the productive capacity of the works, there has been an increased output of 55 million cubic feet of gas per annum; and as the consumption keeps moving upwards, it is felt by the Gas Committee that the time has arrived for an extension of the plant.

The fusing of an electric cable was responsible for a large fire last Tuesday afternoon at the steel foundry of the Howaldt works at Kiel. According to a Central News telegram, the damage is estimated at upwards of £5000.

We have received from the Welsbach Light Company, Limited, the preliminary price list of the globes and shades section of their catalogue. In its 25 large quarto pages, practically every conceivable pattern of globe and shade for upright and inverted incandescent burners will be found, as well as some new types of "Holophane" reflectors for use with inverted burners. The catalogue will be followed by a similar section of the Company's burners and lamps.

Messrs. Ehrhardt and Sehmer, of Saarbrücken, have obtained orders for the supply of two of their four-cycle gas-engines in England. One, for the Skinningrove Iron Company, Limited, which will be the fifth engine of this type they have supplied to the Company, is of 1500-H.P. The other, which is for the Barrow Hematite Steel Company, Limited, is to be arranged so that it may be utilized for blast-furnace blowing or for the generation of electricity; and it will be of approximately 2000-H.P.

GAS COMPANIES' STOCK AND SHARE LIST.

The course of things on the Stock Exchange last week was not uniformly favourable; but inasmuch as they finished at their best, the practical outcome must be regarded as satisfactory. The troubling influences were the continued torrential rains and the hardening of the Money Market, which last factor annoyed the gilt-edged group exceedingly. Illustrating the dictum that anything is better than uncertainty, that market, which had been weak while the decision of the Bank Directors was being awaited, recovered cheerfully when the foreseen rise in the rate of discount became a fact. The tendency at the opening on Monday was irregular. Most of the chief departments were far from strong; but in other quarters—especially in some speculative lines—there was much cheerfulness. Gilt-edged were not well supported, and Consols fell ⅛. Rails showed rather lower prices where any business was done at all. Tuesday was very quiet apart from the approaching settlement. Government issues were rather weighed down by money movements; and Rails were quiet and fairly firm. Some old speculative favourites were brisk. On Wednesday, business was still at low-water mark; but the tone was much more cheerful in spite of some realizing. Government issues were strong enough to resist change, and Rails and Americans improved. Thursday was quiet and dull. Consols fell ⅛; but Rails, after a period of depression, brightened up and scored some advances. Friday's tone was far better. Gilt-edged securities were in demand, and Consols recovered ⅛. Rails were enlivened by the welcome advent of brighter weather and some favourable forecasts; and their prices improved. This cheerful tone was continued on Saturday. Consols advanced another ⅛, closing at 75½ to 75¾, and Rails were still on the up-line. The Money Market was agitated by the scarcely expected hardening of discount rates. On Thursday, the Bank of England put their rate up from 3 to 4 per cent. Business in the Gas Market was a great deal quieter—certainly the quietest week of the year so far. But it is pretty evident that the scarcity of stock in the market is one factor responsible for inaction; and brokers are unable to execute the buying orders that are on their books, such is the scarcity of sellers. In Gaslight and Coke issues, business in the ordinary was abnormally quiet; about a dozen transactions being the sum total of the week. Prices ranged from 105½ to 106¼; the quotation closing at an advance of ¼. In the secured issues, the maximum advanced a point, with dealings at 82 to 84, the preference was done at par, and the debenture at 76 and 77. South Metropolitan changed hands at 119¾ and 120 *cum div.* and 118 *ex div.* (a rise of ¾), and the debenture marked 77¼. In Commercials, the 4 per cent. made 109, and the 3½ per cent. 104, both *cum div.* The debenture made 73½ and 73⅞. Among the Suburban and Provincial group, British was done at 44⅞ and 45⅜, Bournemouth "B" at 16, and South Suburban at 120. Advances were marked in Brighton, South Suburban, and Wandsworth. On the local Exchanges, Liverpool "A" realized 218, and ditto "B" 157, both *cum div.*, and ditto debenture 101 (a rise of 1), and Newcastle 98¾. In the Continental companies, Imperial made from 179½ to 181½, European 20, and Union 85½ and 85¾. Among the undertakings of the remoter world, Monte Video fetched 11 3/16, Primitiva 7 3/16 and 7 5/16, ditto preference from 5 5/16 to 5 7/16, and San Paulo preference 12¼.

Issue.	Shares.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,551,868	Stk.	Apl. 12	5	Alliance & Dublin Ord.	73—78	..	6 8 2
374,000	Stk.	July 12	4	Do. 4 p.c. Deb.	89—91	..	4 7 11
250,000	5	Apl. 12	7½	Bombay, Ltd.	6—6½	..	5 15 5
50,000	10	Aug. 29	15	Bourne- mouth Gas & Water { 10 p.c. B 7 p.c. Pref. 6 p.c.	28—29*	..	5 3 5
332,000	10	"	7		15⅜—16¼*	..	4 6 2
75,000	10	"	6		14—14½*	..	4 2 9
380,000	Stk.	Aug. 14	13⅛	Brentford Consolidated	255—260	..	5 3 10
330,000	"	"	10½	Do. New	193—198	..	5 6 1
50,000	"	"	5	Do. 5 p.c. Pref.	116—118	..	4 4 9
206,250	"	June 14	4	Do. 4 p.c. Deb.	95—97	..	4 2 6
218,230	Stk.	Aug. 29	11	Brighton & Hove Orig.	210—215*	+½	5 2 4
244,200	"	"	8	Do. A Ord. Stk.	152—155*	..	5 3 3
530,000	20	Mar. 28	12½	British	44½—45½	..	5 9 11
120,000	Stk.	June 28	4	Do. 4 p.c. Deb. Stk.	91—93	..	4 6 0
250,000	Stk.	June 28	4	Buenos Ayres 4 p.c. Deb.	93—95	..	4 4 3
100,000	10	—	—	Cape Town & Dis., Ltd.	2—3	..	—
100,000	10	—	—	Do. 4½ p.c. Pref.	3½—4½	..	—
100,000	Stk.	June 28	4½	Do. 4½ p.c. Deb. Stk.	74—75	..	5 15 5
157,150	Stk.	Aug. 29	5	Chester 5 p.c. Ord.	107½—109½*	..	4 11 4
1,513,280	Stk.	Aug. 29	5/9/4	Commercial 4 p.c. Stk.	105—107*	–¼	5 2 1
560,000	"	"	5½	Do. 3½ p.c. do.	100—102*	–⅜	5 4 5
475,000	"	June 14	3	Do. 3 p.c. Deb. Stk.	73—75	..	4 0 0
800,000	Stk.	May 31	4	Continental Union, Ltd.	83—86	..	4 13 0
200,000	"	"	7	Do. 7 p.c. Pref.	133—135	..	5 3 8
492,270	Stk.	—	5½	Derby Con. Stk.	122—124	..	4 8 9
55,000	"	—	4	Do. Deb. Stk.	103—105	..	3 16 2
840,150	10	July 26	10	European, Ltd.	19—20	..	5 0 0
16,160,600	Stk.	Aug. 14	1/17/4	Gas-light and Coke { 4 p.c. Ord. 3½ p.c. max. 4 p.c. Con. Pref. 3 p.c. Con. Deb.	105–107	+½	4 11 0
2,600,000	"	"	3½		81—84	+1	4 3 4
4,062,235	"	"	4		93—100	..	4 0 0
4,531,705	"	June 14	3		75—77	..	3 17 11
258,740	Stk.	Mar. 14	5	Hastings & St. L. 3½ p.c.	93—95	..	5 5 3
82,500	"	"	6½	Do. do. 5 p.c.	—	..	—
70,000	10	Apl. 26	11	Hongkong & China, Ltd.	16½—17	..	6 9 5
131,000	Stk.	Mar. 14	7⅜†	Ilford A and C	157—160	..	4 13 9
65,780	"	"	6½†	Do. B	123—125	..	4 16 0
65,500	"	June 28	4	Do. 4 p.c. Deb.	91—93	..	4 6 0
4,940,050	Stk.	May 15	9	Imperial Continental	178—183	..	4 18 4
1,235,000	Stk.	Aug. 14	3½	Do. 3½ p.c. Deb. Red.	86—88	..	3 19 7
200,242	Stk.	Aug. 29	6	Lea Bridge Ord. 5 p.c.	122–125*	–½	4 16 0

Issue.	Shares.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
561,000	Stk.	Aug. 29	10	Liverpool United A.	211—213*	..	4 13 11
718,100	"	"	7	Do. B.	152½–154½*	..	4 10 7
306,083	"	June 28	4	Do. Deb. Stk.	100—102	+1	3 18 5
£3,480	Stk.	June 28	3	Maidstone 3 p.c. Deb.	66—68	..	4 8 3
75,000	5	June 14	6	Malta & Mediterranean	4⅛—4⅜	..	6 3 1
560,000	100	Apl. 1	5	Met. of 5 p.c. Deb.	—	..	—
250,000	100	"	4½	Melbourne 4½ p.c. Deb.	101—103	..	4 7 5
541,920	20	May 31	3½	Monte Video, Ltd.	11—11½	..	6 1 9
1,775,892	Stk.	July 26	4⅜	Newc'tle&G'tesh'd Con.	98½—99	..	4 8 5
529,705	Stk.	June 28	3½	Do. 3½ p.c. Deb.	85—85½	..	4 1 10
55,940	10	Aug. 29	7/7/0	North Middlesex 7 p.c.	13½—14½*	..	5 1 4
300,000	Stk.	May 15	8	Oriental, Ltd.	134—136	..	5 17 8
60,000	5	Mar. 14	8	Ottoman, Ltd.	8¼—8¾	+½	4 11 5
60,000	50	Aug. 14	13	Portsea Island B	127—130	..	5 0 0
100,000	50	"	12	Do. C	124—127	..	4 14 6
398,490	5	May 15	8	Primitiva Ord.	7⅛—7⅝	..	5 8 6
796,980	5	June 28	5	Do. 5 p.c. Pref.	5¼—5½	+1/16	4 10 11
488,900	100	June 1	4	Do. 4 p.c. Deb.	96—98	..	4 1 8
312,650	Stk.	June 28	4	River Plate 4 p.c. Deb.	93—95	..	4 4 3
275,000	5	Apl. 12	12	San Paulo, Ltd.	13½—14½	..	4 2 9
150,000	10	"	6	Do. 6 p.c. Pref.	11⅞—12¼	..	4 18 0
125,000	50	July 1	5	Do. 5 p.c. Deb.	49—51	..	4 18 0
135,000	Stk.	Mar. 14	10	Sheffield A	234—236	..	4 4 9
209,984	"	"	10	Do. B	234—235	..	4 5 1
523,500	"	"	10	Do. C	233—235	..	4 5 1
90,000	10	May 31	7½	South African	8—9	..	8 6 8
6,429,895	Stk.	Aug. 29	5/9/4	South Met., 4 p.c. Ord.	116—118*	+¾	4 12 8
1,895,445	"	July 12	3	Do. 3 p.c. Deb.	76—79	..	3 15 11
209,820	Stk.	Aug. 14	8½	South Shields Con. Stk.	155—157	..	5 8 3
605,000	Stk.	Aug. 14	5/16/8	S'th Suburb'n Ord. 5 p.c.	119—121	..	4 16 3
60,000	"	"	5	Do. 5 p.c. Pref.	116—118	+1	4 4 9
117,058	"	July 12	5	Do. 5 p.c. Deb. Stk.	120—122	..	4 2 0
502,310	Stk.	May 15	5	Southampton Ord.	105—107	..	4 13 6
120,000	Stk.	Aug. 14	7½	Tottenham A 5 p.c. and B 3½ p.c.	142—145	..	5 0 0
483,940	"	"	5⅜		114—116	..	4 19 2
149,470	"	June 28	4	Edmonton 4 p.c. Deb.	94—96	..	4 3 4
182,380	10	June 15	5	Tuscan, Ltd.	8½—8⅝	..	5 15 11
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	97—99	..	5 1 0
236,476	Stk.	Aug. 14	5	Tynemouth, 5 p.c. max.	110—112	..	4 9 3
255,636	Stk.	Aug. 29	6⅞	Wands- B 3½ p.c.	133—141*	+⅜	4 17 6
85,766	"	June 28	3	worth 3 p.c. Deb. Stk.	70—72	..	4 3 4

Prices Marked * are "Ex. Div." † Next dividend will be at this rate.

The Kibworth Gas Company, Limited, has been registered with a capital of £10,000, in £1 shares, to take over the business of the Kibworth Gaslight and Coke Company, Limited, incorporated in 1862, and to adopt an agreement with the Company and H. T. Grant, the Liquidator.

The first annual flower show promoted in connection with the East Greenwich station of the South Metropolitan Gas Company was held at the Institute on the 24th ult. The show proved to be a great success in every way, and the encouragement thus given to the promoters has decided them to continue it. The entries numbered 250, and the quality of both flowers and vegetables was of a high standard; evoking very favourable comment from both of the Judges—Messrs. A. Spencer and M. Matthews. The Engineer-in-Charge at the station (Mr. F. J. Bywater) performed the opening ceremony. He congratulated the men upon the excellent produce they had submitted, and said he considered it was time they started a show of their own. The Judges, after giving some practical advice to the competitors, expressed admiration of the quality of the exhibits, and of the way in which the show had been engineered. A vote of thanks was accorded to them; and a similar vote was passed to Mr. Bywater.

Messrs. Edward Cockey and Sons, Limited, of Frome, have recently secured contracts for a two-lift spiral-guided gasholder in steel tank for the Tredegar Urban District Council, for extensions to a hot-coke conveyor for the Bristol Gas Company, and for purifiers for the Rothwell Urban District Council.

Every competent gas salesman should be in a position to prove to a hesitating customer that gas is more economical than electricity; but if he can support his arguments by a figure or a diagram which will appeal to the eye of the listener, he will probably be more successful in securing him as a consumer. Such a figure as that alluded to will be found in a four-page circular just printed by the Welsbach Company, under the title of "How Gas Scores over Electricity." On the second page, figures are the media selected for the demonstration; but on the third there are some circles and lines, printed in red, which show at a glance the quantity of light obtained from sixpennyworth of gas and electricity respectively, taking the former at 3s. 9d. per 1000 cubic feet, consumed with a Welsbach-Kern burner, and the latter at 6d. per unit with a metal filament lamp. The circle representing electricity is the size of a sixpence and the line 1⅛ inches long; whereas the gas circle is 1½ inches diameter and the line 4 inches long.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

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TRAVELLER. Forth and Clyde and Sunnyside Iron Companies, Falkirk.

Appointments, &c., Wanted.

LEADBURNER, &c. Masonic, 118, Galloway Road, Shepherd's Bush.
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PURIFIERS, CENTRE VALVE, HYDRAULIC MAINS, ASCENSION PIPES, ARCH PIPES, MOUTHPIECES, &c. Clitheroe Gas Department.
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Meeting.

OTTOMAN GAS COMPANY, London, Tuesday, Sept. 17, one o'clock.

Stock and Shares.

LEATHERHEAD GAS AND LIGHTING COMPANY. Tenders by Sept. 18.

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HALIFAX GAS DEPARTMENT. Tenders by Sept. 9.
SWINTON AND MEXBOROUGH GAS BOARD. Tenders by Sept. 12.

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DEWSBURY GAS DEPARTMENT. Tenders by Sept. 17.

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Apply to Albert E. Layton, Engineer and Manager, Gas-Works, Redditch.

FOR SALE—A large quantity of Second-Hand LAMP COLUMNS (Newton, Chambers, No. 60 Pattern), also a quantity of 14-inch COPPER LANTERNS suitable for Flat-Flame Street Lighting.
For Particulars and Price, Apply to the Barnsley Gas Company.

BOROUGH OF CLITHEROE.

CARBONIZING AND PURIFYING PLANT FOR SALE.

OWING to recent Extensions, the fol- lowing PLANT is FOR SALE.
Two Water-Lute PURIFIERS, each 15 ft. by 10 ft. by 4 ft. deep, with Lifting Apparatus.
Two Water-Lute PURIFIERS, each 16 ft. 3 in. by 9 ft. by 5 ft. deep, with Lifting Apparatus.
One 10-in. Dry-Faced CENTRE VALVE, with Pipes and Connections.
HYDRAULIC MAINS, ASCENSION PIPES, ARCH PIPES, MOUTHPIECES, &c.
The Plant can be seen at the Gas-Works on Application to the undersigned, to whom Offers must be sent.

Robert Barrett,
Engineer and Manager.

Gas-Works, Clitheroe,
Aug. 30, 1912.

COUNTY BOROUGH OF HALIFAX.

THE Gas-Works Committee of the Halifax Corporation invite TENDERS for the Supply of GAS COAL to be supplied in such quantities as may from time to time be determined by the Gas-Works Committee, during the period ending June 30, 1913.
Forms of Tender and further Particulars may be obtained on Application to Mr. W. B. M'Lusky, Engineer, Gas-Works, Halifax.
Tenders, endorsed "Coal," must be sent to the undersigned not later than 12 o'clock noon on Monday, the 9th of September, 1912.
The Committee do not bind themselves to accept the lowest or any Tender.

By order,
Percy Saunders,
Town Clerk.

Town Hall, Halifax,
Aug. 28, 1912.

THE Swinton and Mexborough Gas Board invite TENDERS for the Supply of from 2000 to 5000 Tons of Screened or Unscreened GAS COAL or NUTS to be delivered during the Twelve Months ending Sept. 30, 1913, at the Gas-Works, at Swinton.
The Tender, which must be accompanied by a Form of Contract for Inspection, must be sent to me, in sealed envelope, endorsed "Coal Tender," not later than Sept. 12 next.
The Board do not bind themselves to accept the lowest or any Tender.
Any further Particulars may be obtained from the Engineer to the Board, Mr. J. H. Brearley, Gas-Works, Longwood.
Dated the 28th day of August, 1912.

J. W. Hattersley,
Clerk to the Board.

BOROUGH OF DEWSBURY.

THE Gas and Water Committee of the above Corporation are prepared to receive TENDERS for the Purchase of the Surplus TAR produced at their Gas-Works, Savile Town, for the Term of One Year from the 1st day of September, 1912 (or for such longer Term as may be decided upon).
The Tar will be delivered free into Contractors' Boats at the Gas-Works Wharf on the Aire and Calder Canal, Savile Town, Dewsbury, or into Contractors' Railway Tanks at their Gas-Works Sidings, Dewsbury.
Sealed Tenders to be sent to the undersigned on or before Tuesday, the 17th day of September next, endorsed "Tender for Tar."
The Purchaser will be required to enter into an Agreement with the Corporation for the due performance of his Contract.
Further Information if required may be obtained on Application to the Gas Manager, Mr. Geo. Wm. Fligg, Gas-Works, Savile Town, Dewsbury.
The Council do not bind themselves to accept the highest or any Tender.

H. Ellis,
Town Clerk.

Town Hall, Dewsbury,
Sept. 2, 1912.

A FIRM of Tar Distillers in Russia are desirous of ACQUIRING PATENTS or NEW FORMULAS for the MANUFACTURE FROM TAR of CHEMICAL PRODUCTS, DISINFECTANTS, &c.
Address, with full Particulars, No. 5617, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

PATENT FOR SALE OR LICENCE.

COMBINED COCKS AND NEEDLE VALVES.

THE Proprietor of Letters Patent No. 17,195 of 1910, relating to COMBINED COCKS AND NEEDLE VALVES, desires to DISPOSE of the Patent or to Grant LICENCES to Interested Parties, on Reasonable Terms, with a view to the adequate Working of the Patent in this Country.
Inquiries to be addressed to Cruikshank and Fairweather, Limited, International Patent Agency, 65-66, Chancery Lane, London, W.C.

LEATHERHEAD GAS AND LIGHTING COMPANY.

SALE BY TENDER.

THE Directors of the above Company invite TENDERS for 1000 SHARES OF £10 EACH and £5000 FOUR PER CENT. DEBENTURE STOCK, being a portion of the Additional Capital authorized to be raised in pursuance of the powers of the Leatherhead Gas Act, 1912.
Minimum Price £10 per £10 Share and £100 for each £100 Debenture Stock.
Dividends paid on ordinary shares for last Seven Years Five per cent., free of Income-Tax.
Tenders to be Delivered not later than Eleven a.m. on Wednesday, the 18th of September, 1912.
Particulars and Forms of Tender can be obtained on Application to

John Young,
Secretary.

North Street, Leatherhead,
August, 1912.

OTTOMAN GAS COMPANY, LIMITED.

NOTICE is Hereby Given, that the ORDINARY GENERAL MEETING of the Shareholders of this Company will be held at 59 and 60, Gracechurch Street, E.C., on Tuesday, Sept. 17, 1912, at One o'clock precisely, to receive the Report of the Directors and Statement of Accounts for the Half Year ended the 30th of June last; to declare a Dividend; to consider an increased remuneration to the Directors; and for General Purposes.
The TRANSFER BOOKS WILL BE CLOSED from Sept. 10 to 17, both days inclusive.

By order of the Board,
A. W. Cooper,
Secretary.

59 and 60, Gracechurch Street,
London, E.C., Aug. 20, 1912.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MESSRS. A. & W. RICHARDS beg to notify that their SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.
Terms for Issuing New Capital, and also for including other Gas and Water Stocks and Shares in these Periodical Sales, will be forwarded on Application to Messrs. A. & W. Richards, at 18, Finsbury Circus, E.C.

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